THE MARINE REVIEW

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Back Foch's Drive With Your Funds

Germans Can Not Stand Adversity and Success in the New Loan Will Add to Their Present Discouragement

REALITIES of war have exploded innumerable theories and none more effectually than the plausible contention that the delicate fabric of modern finance would not support a war of more than a few months' duration. Four years after one man made the decision that brought war to 400,000,000 Europeans and 17 months after the same man, not satisfied with the added enrollment in the forces against him of three-quarters of a billion British and French colonists, Italians, Japanese, Indians, Chinese, Siamese, etc., brought 100,000,000 Americans from neutrality to enmity, we find a call issued for the largest individual loan on record. The totals of two, three and four billions of dollars, which represent sales and subscriptions to the three other Liberty loans, are dwarfed by the $6,000,000,000 required in the fourth loan.

The Marine Trade and the New Loan

In this Liberty loan campaign, the shipbuilders, the ship operators and their employes hold a position peculiarly their own. In a broad sense, their present business and trade is a creation of the war. The few shipyards of other days have been supplanted by hundreds of new ship construction plants. The few ships of the barren years before the war are being forgotten in a broadening flood of new cargo carriers.

The opening of the European war found American shipyards and shipping, with but few exceptions, in a comatose condition that showed signs of becoming chronic. The entrance of the United States found our yards and shipping invigorated by an infusion of foreign war orders coupled with an increased number of American ships resulting from the premium of a powerful neutral registry. A year later, the whole trade has been practically remade. Government supervision has become a reality and with it appear the funds to rehabilitate our existing facilities and to initiate new plants. From a little considered industry, shipbuilding and ship operating rank among the nation's greatest.

As an employer of labor and funds, the shipyards have for months had almost the first call on the country's resources. Priority rulings may change almost daily, the nation's supplies of steel, of coal, and of men may drop well below the constantly ascending line of demand, but through it all the shipyards are secure. The United States has been won over *en masse* to the vital importance of ships in quantity and is determined to produce these ships, regardless of the fate of other important but less vital industries.

What Shipyard Labor Owes

From the labor side, the rights of the nation to the workmen's fullest financial support are equally incontestable. Wage scales today are the highest ever known and the thrifty workman finds the opportunity for piling up his savings better than ever before as the cost of living has not climbed as rapidly as the cost he exacts for his services. The impetus to high wages started in the shipyards. Transforming an industry from a small beginning to one of the greatest in the country, brought about such a demand for labor that higher wages than other trades could afford to pay, were offered to attract men quickly. The hiring of men from other yards boosted this rising scale. Today, workmen with their enhanced rewards for their labor can find in the growth of the shipyards the answer to much of this gain.

These remarks appeal possibly more to selfish than to unselfish motives. But the men in the yards and on the ships are in more intimate contact with the growing need for supporting the boys at the front than most other workmen as their every effort is designed for that purpose alone.

The shipbuilding and shipping industries should lead the country in their response to the new loan. When the German is reeling from the allies' military successes, Americans have the opportunity to crush what feeble hopes he may still cling to, by an avalanche of new war funds.

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"I Am 29 Days Old—Look Me Over"

A Great Lakes Vessel Starts for Salt Water Less Than a Month from the Time Her Keel Was Laid

AMERICAN shipyards, spurred by the urgent demand for vessels to transport troops and supplies to Europe, are accomplishing feats that border on the marvelous. Every one connected with the industry, from presidents down to heater boys, is fired by a steadily growing determination to defeat the Hun.

With a united industry working as near the theoretical 100 per cent as possible, it is not surprising that many shipbuilding records have been established, reports of which have appeared from time to time. It remained for a Great Lakes shipyard, however, to establish a shipbuilding record that may stand for a long time—it is unsafe to predict how long—and that will be recorded in shipbuilding annals as a monument of what determined men can do when the chief business of the country is war.

When the steel cargo carrier CRAWL KEYS took the water at the Ecorse, Mich., yards of the Great Lakes Engineering Works on July 27, a world's record in shipbuilding was established, for, incredible as it may seem, this vessel was launched in 14 days from the time her keel was laid. Fifteen days later she was fully completed and accepted by the shipping board officials. As she steamed away from the shipyard on her long voyage to salt water she bore the following announcement in large letters on either side of her bridge house: "I AM 29 DAYS OLD—LOOK ME OVER."

When the CRAWL KEYS was launched, her hull was 93 per cent complete while the entire ship was 80.5 per cent finished. These figures are taken from inspection reports of the Emergency Fleet corporation.

The phenomenal record made in building the CRAWL KEYS was not due to any abnormal haste or to extremely fortunate circumstances. On the other hand, it was the direct outcome of careful planning on the part of the shipyard executives, together with the hearty coperation of the company's workers.

Before the vessel's keel was laid, Charles Baisley, the yard superintendent, assembled his men and informed them that the company was determined to establish a world's record for shipbuilding. If any of the men were skeptical, Mr. Baisley had figures and facts to substantiate his claim that it was possible for a Great Lakes yard to set a record for steel shipbuilding. The men caught the spirit of enthusiasm necessary for carrying out big undertakings and the work began in earnest.

In considering the remarkable time in which this vessel was built it must be borne in mind that she is not a fabricated ship. She was built from the keel up by the company which launched her.

A Great Lakes Triumph

THE urgent demand for ships to be turned out faster than the Huns can sink them has forced the shipyards of this country to exert every effort to launch tonnage. The results that are being obtained are surprising—instead of a nation in which maritime pursuits were practically ignored, ship construction has become one of the greatest of our industries.

The friendly rivalry between shipyards has fostered the incentive to make every move on the part of the men count and this has established shipbuilding records that were thought impossible a few years ago. Work is being accomplished in weeks where months formerly were required. It remained for a Great Lakes yard, however, to accomplish the almost unbelievable feat of actually sending an 80½ per cent complete ship to the water 14 days after her keel was laid. This is a record that seems certain to stand for some time.

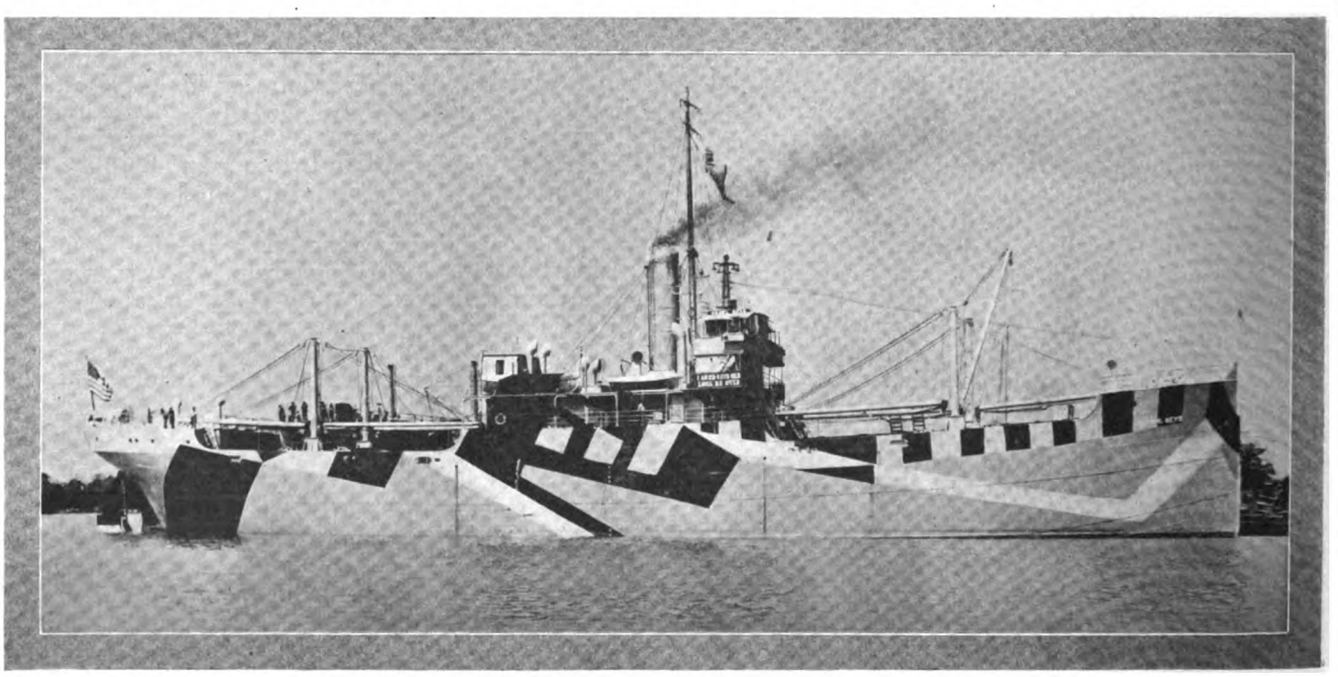

FIG. I—FAMOUS RECORD SHIP CRAWL KEYS CAMOUFLAGED AND READY FOR SEA

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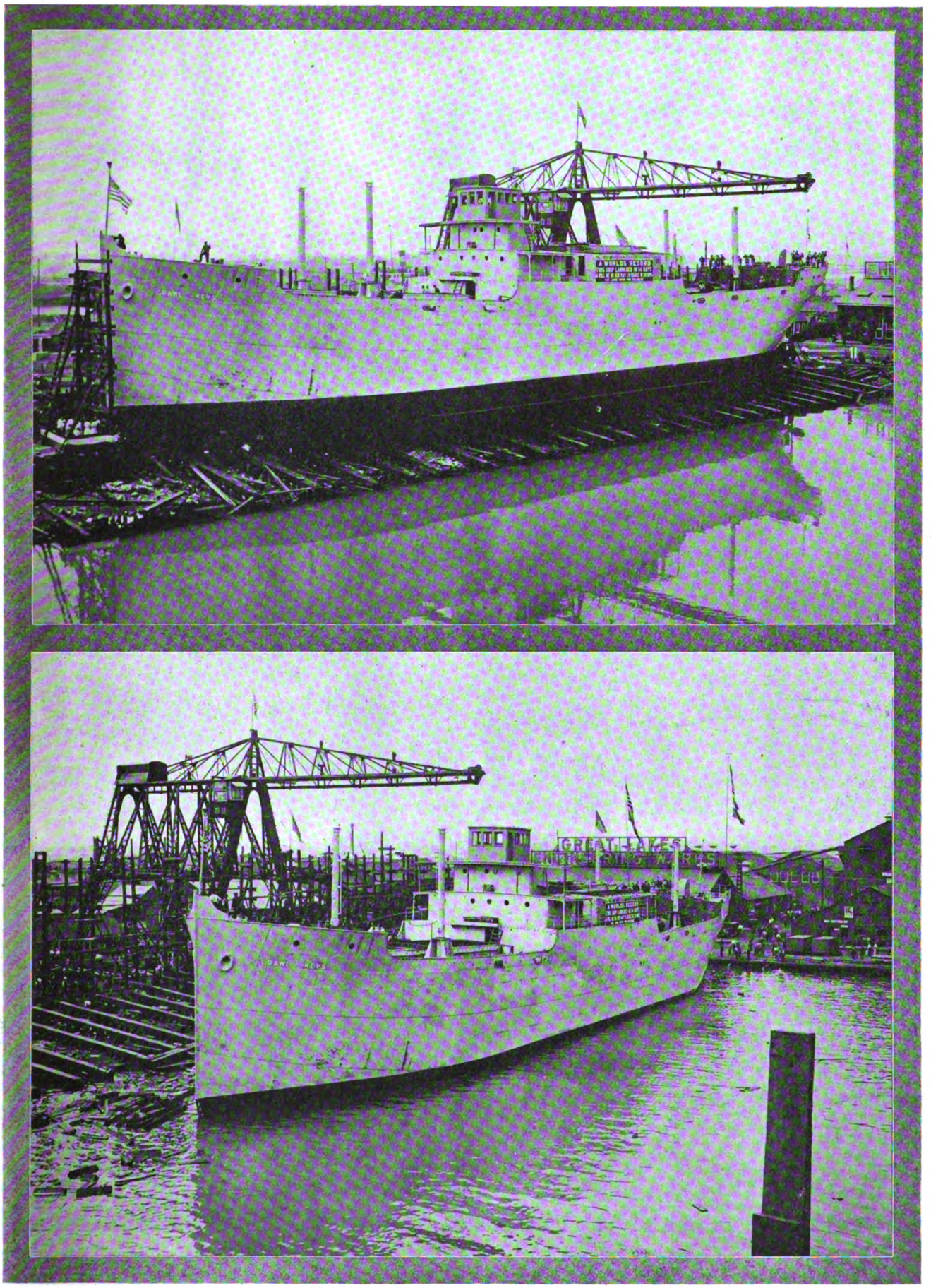

FIGS. 2 AND 3—IN THE UPPER VIEW ALL IS IN READINESS FOR LAUNCHING WHILE THE LOWER ILLUSTRATION SHOWS THE VESSEL AS SHE APPEARED JUST AFTER TAKING THE WATER

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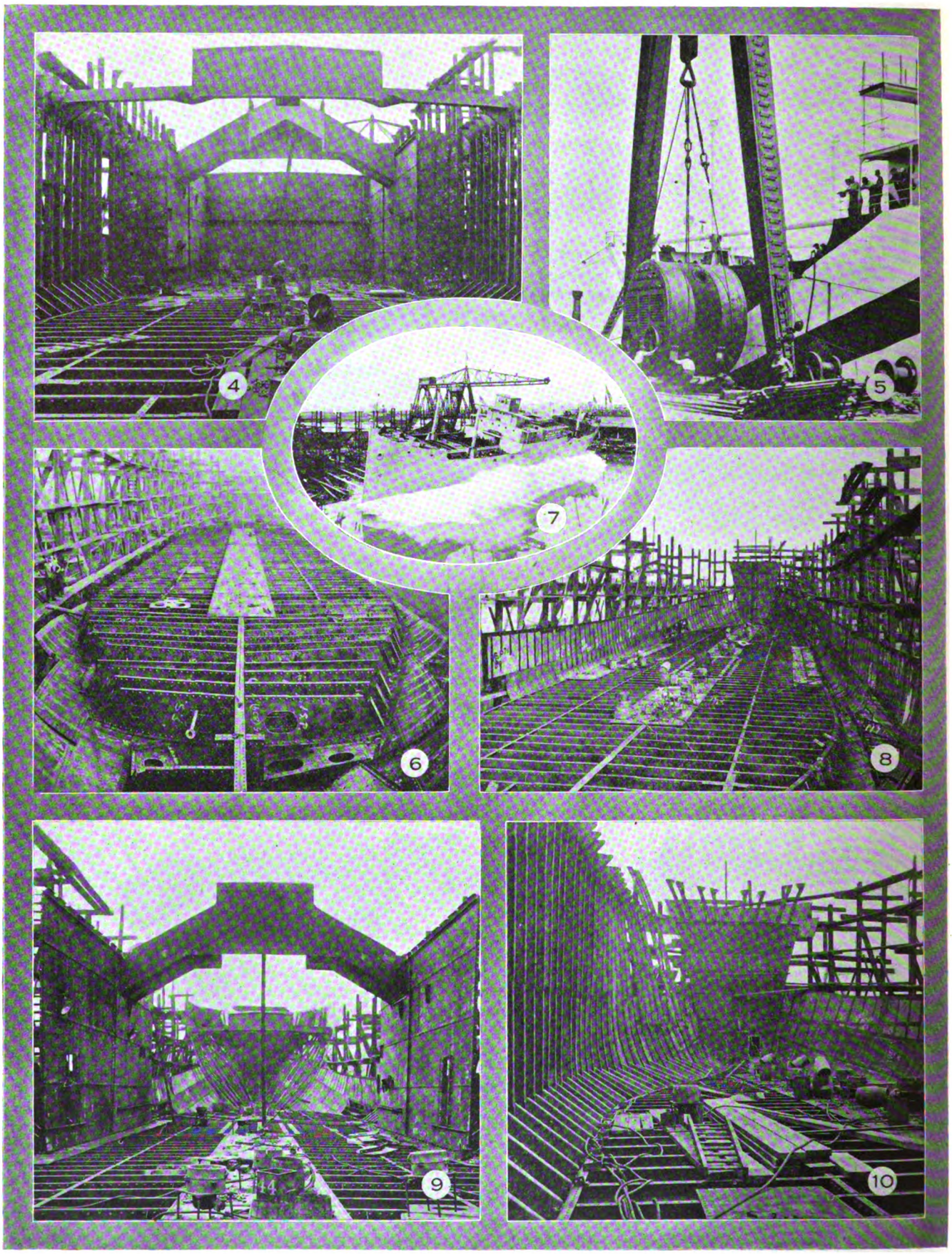

FIG. 4—LOOKING AFT TOWARD THE ENGINE ROOM BULKHEAD. FIG. 5—PREPARING TO INSTALL ONE OF THE BOILERS. THE SHEAR LEGS SWING AND LOWER IT IN PLACE IN THE HOLD. FIG. 6—HOW THE CRAWL KEYS LOOKED WHEN FIVE HOURS OLD. FIG. 7—CRAWL KEYS TAKING THE WATER. FIG. 8—LOOKING TOWARD THE FOREPEAK BULKHEAD. FIG. 9—LOOKING AFT SHOWING SOME OF THE FRAMES AND AFTERPEAK BULKHEAD. FIG. 10—LOOKING FORWARD TOWARD THE FOREPEAK BULKHEAD AND SOME OF THE BOW FRAMING.

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The CRAWL KEYS is a single-deck steel cargo carrier 261 feet overall length, 253 feet between perpendiculars, 43½ feet beam and 22½ feet deep. She is constructed with a double water bottom. She is propelled by an inverted type, triple-expansion engine having cylinders 19, 32 and 54 inches bore by 40-inch stroke. Steam is generated by two Scotch type marine boilers 14½ feet diameter x 11½ feet long, with a working pressure of 190 pounds.

The deck house is placed amidships and contains the officers' quarters, chart house, bridge and pilot house while the firemen and crew are housed aft in the poop. The engine and boilers are installed amidships. Two large cargo hatches are conveniently located, one forward and the other aft of the deck house. Each hatch is served by two cargo masts equipped with quickly operated winches for cargo handling.

Work on the CRAWL KEYS began on July 11. The first steel plate for the keel was lowered into position at 11 a. m. Owing to the thoroughness with which the work had been planned, the building of the vessel progressed rapidly. Fig. 6 shows how the vessel looked at 5 p. m. on the day her keel was laid. As shown, the majority of her main frames are in position as well as her bottom plating. This vast amount of work was thus accomplished in five hours.

The following day, July 12, also saw rapid progress made. When the gangs of workers knocked off for the day the forepeak bulkhead and a number of tank top plates had been installed. This day also saw much of the staging on the waterside erected.

The next day, July 13, all the tank tops, margin plates and the shell above the tank top forward and aft as well as the fore and after peak frames were installed. Fig. 8 shows how the vessel looked at this stage of construction. The view is looking forward and shows the framing, some of the bilge plates and the forepeak bulkhead.

July 14 was Sunday and no work on the vessel was done on that day.

On the following day, however, July 15, the shipyard gangs more than made up for lost time. On this day, work was done on the stern post, fantail, main frames in afterbody, coal bunkers, bulkheads, coal chutes, beams for spar deck and the after cargo hatch. The vessel as she looked on this day is shown in Fig. 9.

The next day, July 16, saw the side frames set up and work done on other parts as follows: Coal bunker bulkhead ends, all bilge brackets and hold bulkheads, boiler room bulkhead forward, all framing on one side, forepeak bulkhead, forepeak frames and the tank top in the boiler and engine rooms. Fig. 4 shows how the work had progressed by this time. This view is looking aft and shows the coal bunkers, coal chute and bulkhead between the engine and boiler rooms. The plate seen in the upper foreground is part of the forward cargo hatch. Fig. 10 is a view looking forward taken on the same day. This shows the forepeak bulkhead and also illustrates the progress made in framing and plating.

On July 17, work was done on tank top plates, the framing was finished and the spar-deck beams were placed in position. Some of the spar-deck plates were also installed in place. Hold stanchions were fitted, work was done on cargo hatches and girders under the deck were placed in position.

The engine room bulkhead was erected the next day, July 18, and all shell plates on the sheer strake were assembled, all furnaced plates were assembled in place and the launching ways were 50 per cent complete.

On July 19, the engine casing, boiler casing and poop bulkhead were installed and the spar deck completed. Work was also done on the cargo hatches, house, bulkheads, trunk decks, deck house, spars and poop deck.

The bridge deck beams were installed on the following day, July 20, and work was also done on the house bulkhead casing, forecastle deck and forecastle bulkhead.

July 21 was Sunday. On the following day, July 22, work was done on

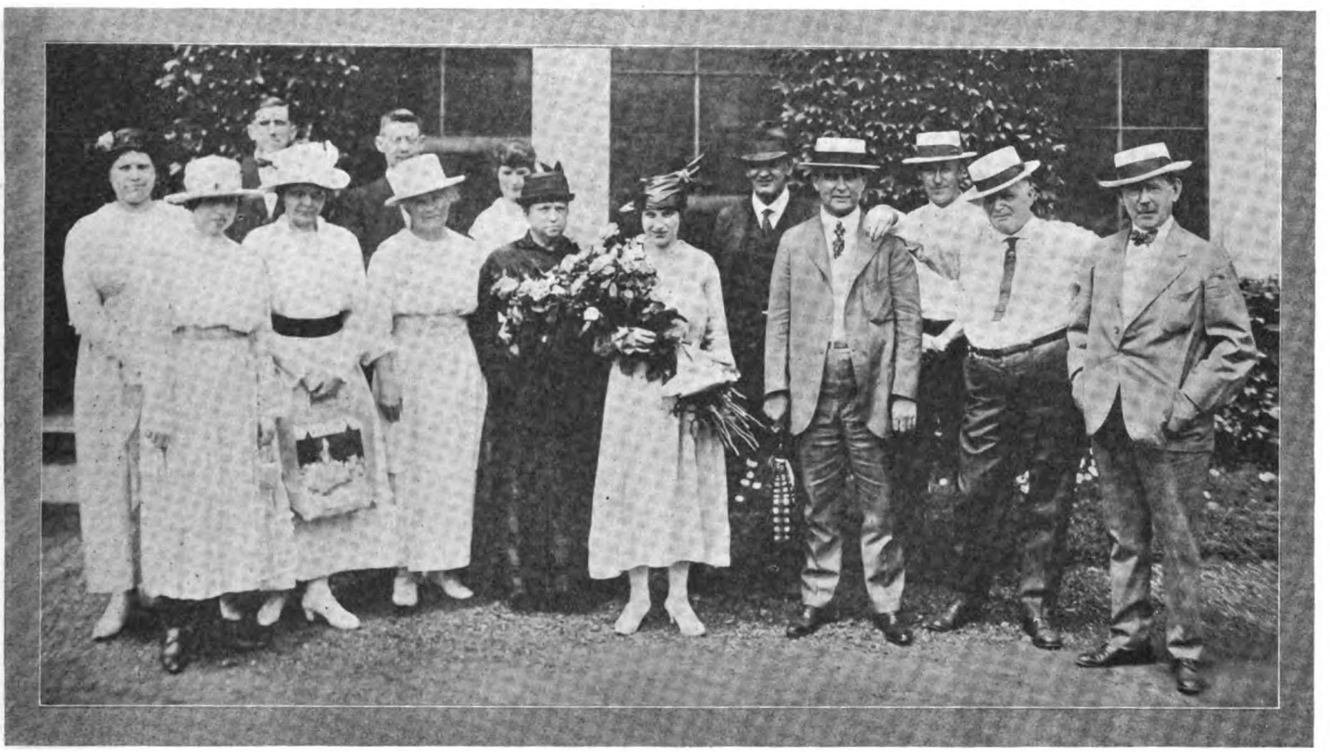

FIG. 11—THE CRAWL KEYS WAS CHRISTENED IN THE TIME HONORED MANNER—CHAMPAGNE WAS BROKEN OVER HER BOW BY A PRETTY GIRL

The group in the illustration include, right to left, front row: John R. Russel, Charles E. Baisley, Charles Short and Miss May Jackson, the sponsor. Right to left, back row: Mr. Spaddock, boat boss; J. A. Ubsdell, vice president and general manager. Others in the party are guests of the sponsor.

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the bridge deck plating, bulwark rails and deck angles on the spar deck. On July 23, work was done on the shell plating forward, forecastle deck, bridge deck house and chart house.

Small angles were installed and other inside work completed on July 24. Work was also done on the shaft tunnel and the derrick masts were fitted in place. The stern tube was bored out on July 25, the hull work was finished and the launching ways were completed. The next day, July 26, the propeller was placed in position on its shaft and the hatch beams were finished.

July 27 was the big day, 11 a. m. marking the end of the fourteenth day of progress. At this hour, Miss May Jackson, the vessel's sponsor smashed a bottle of champagne on the vessel's bow, the launching triggers were released and, without a hitch, the record vessel slid down the ways into the waters of the Detroit river. As the ship took the water she bore a banner with the following inscription: "A world's record. This ship launched in 14 days and will be on the way to France in 30 days. We are with you 'Charlie.'"

Rapid Fitting-Out

After the vessel was launched, the work was not permitted to slow up in the least. The same spirit that prompted the men to get the vessel in the water on record time, urged them on to an equal effort to make possible the delivery of the vessel to the shipping board in less than a month from the time the first keel plate was lowered in position.

Charles E. Baisley, superintendent who supervised the work received the following congratulatory telegram from Charles M. Schwab.

"Have just learned that you are launching today a ship constructed in 14 days. You have my hearty congratulations. I was so pleased with you and your men when I visited your plant that I am not surprised to hear of this remarkable performance and I hope the work will give you the credit you deserve and I shall do my best to see that they do as far as myself and the Emergency Fleet corporation are concerned. We extend to you our profound thanks and hearty congratulations."

Sincerely,
(Signed) C. M. Schwab.

Although the CRAWL KEYS was constructed in record time, speed was not allowed to lower the quality of the work. An inspection of the vessel reveals that she is a fitting example of the steel shipbuilder's art and that her workmanship is up to the high standard for which the Great Lakes yards are noted.

An English Satire on Government Yards

ENGLAND'S supervision of shipbuilding and ship operating has not met with unanimous approval. In fact the comments made in recent weeks by various officials of steamship companies and by others prominent in maritime affairs, have indicated that this control is becoming more and more galling. An index to this feeling was given in the glossary of nautical terms compiled by a Liverpool, England, paper and published in THE MARINE REVIEW in April. The following poem has just appeared in *Fairplay*, an English magazine, with this comment: "It seems to relate to a yard in the Bristol channel, but whether or not the concern at the time was controlled by a Brigadier-Admiral, assisted by a shipbuilding expert with the equally composite rank of Sub-Lieutenant-Major, is doubtful." The poem carries the title "The Boat Builders—A Tragedy in Eighteen Spasms."

The Boat Builders

(A Tragedy in Eighteen Spasms.)

Years ago when the world was at war
T'was decided by some who a shortage foresaw
To build a boat on the Wye side shore.

The boat was to be of the "standard" type,
Good for a cargo and good for a fight,
A veritable triumph of England's might.

So a Company formed with brass and brains,
Who bought up lands and laid down drains,
And worked out on paper their probable gains.

But it came to the ears of the powers that be,
And t'was whispered by one of the Admiralty
"I fancy that this is the place for we."

So his lordship Geddes, the first Sea Lord,
Got into his armor and girt on his sword,
And 'phoned to the "Beaufort" for bed and board.

He arrived on a day when the skies were blue,
He came and he saw and he conquered too,
And wired to his pals in town "It's a do."

Then his pals got busy and did their bit;
Though the Company started to snarl and spit,
They jolly soon gave them notice to quit.

Then struck by the fact that the laborers were few,
And not knowing what the devil to do,
They appealed to the Army to help them through.

And the Army laughed with unholy glee
And passed the word to the bold R. E.
To furnish large drafts to the Admiralty.

The Navy acquired land far and near,
The military did the same with the beer
Till the townsfolk lifted their voices in fear.

The first hundred thousand laid down a drain,
The second draft took it all up again,
Then they held an inquiry and tried to explain.

Then the Admiralty blasted the Army crocks,
Who blasted the men and hitched their socks,
And the men, poor devils, they blasted the rocks.

The public got raw and commenced to squeal,
To the R. E.'s went forth a most frantic appeal,
So they cackled a lot and then laid a keel.

The years passed by and the keel being laid,
They lost it twice and had a new one made;
Nobody minded, the public paid.

The workers toiled and in time grew gray,
Gave in their checks and passed away,
And their sons stepped into their shoes next day.

But at last one day a rumor grew
That the Army and Navy had put it thro';
On the morrow the boat would be launched on the blue.

The town was bedecked with flags and flowers,
Representatives came from the ruling powers,
Caring neither for sleet, nor snow nor showers.

There were cheering crowds on the river bank,
The Army and Navy rank on rank,
As she took the water the bally boat sank.

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Wanted: A Few American Names

Ships Are Convenient but German Sounding Names Are Disastrous—Details of Hun Plot to Use U. S. Registry as Cloak

WHEN the vessels of the American Transatlantic Co. were taken over recently by A. Mitchell Palmer, alien property custodian, it was disclosed that the vessels were German owned and that a plot based on typical German duplicity had been going on for three years in an attempt to deceive the United States government as to the true ownership of the vessels.

The active member of the American Transatlantic Co., afterward known as the Foreign Transport & Mercantile Corp., was Richard G. Wagner, born in Milwaukee of German parents. Wagner, as the alien property custodian points out, was a typical German, one of the type who profess to be 100 per cent American while at the same time carrying out secret plans to further the German cause. His true German characteristics were further on display as much of his intrigue was of a crude sort, childlike in fact. Under a gruelling cross examination Wagner was compelled to admit the fact which his own correspondence revealed, that Germany supplied the funds to finance the shipping venture.

Attempts were made to embroil the United States with England as an outcome of Wagner's operations for when the GENESEE, one of Wagner's ships was seized by the British Ambassador Von Bernstorff and his staff of propagandists did all they could to agitate dissension and to bring about a break between this country and England over this "infringement" on American rights.

In an attempt to deceive the United States government as to the stockholders of his company, Wagner repeatedly tried to get men with American names to act as directors. He sent out many form letters to influential Americans. Edward B. Elcock, of Chicago, was persistently urged to lend the use of his name to prove that the vessels were American owned, and was even offered stock, gratis, if he would give his consent. Mr. Elcock, however, was too loyal to America to consider the proposition and, as the correspondence given in this article shows, too shrewd to be caught in the same net that had ensnared other well meaning but less shrewd Americans.

Wagner was a hard worker and succeeded in partially deceiving the American, British and French governments for a period of three years. The full story of his activities as revealed by the alien property custodian and published in this article discloses one of the most carefully laid plans to deceive the government that has developed since the long story of German deception in this country began to be unfolded.

A. Mitchell Palmer, alien property custodian, announced recently that he had taken over the American Transatlantic Co. and the Foreign Transport & Mercantile Corp. on the ground that their stock is owned by the shipping interests of Germany. In compliance with Mr. Palmer's demand, the shares in the American Transatlantic Co. and in the Foreign Transport & Mercantile Corp. have been delivered to him.

Wagner Admits Deception

Mr. Palmer took over these concerns after Richard G. Wagner the moving spirit of the company in this country, had confessed to Francis P. Garvan, director of the bureau of investigation of the alien property custodian's office, that for three years he had deceived various government departments, the British and French prize courts, and senators and congressmen, as to the real ownership of the company.

Under a grilling cross-examination by Mr. Garvan, Wagner confessed that the money with which these companies were organized and with which their ships were purchased, had been supplied by persons with German affiliations, and that practically no money belonging to an American citizen had ever been invested in the companies.

The value of the ships of these two companies can best be judged from the fact that the Hudson Bay Co. had offered to pay $7,500,000 for them. Wagner demanded $8,000,000. The London board of trade, however, objected to the Hudson Bay Co. paying more than $7,500,000. Mr. Wagner refused this offer, although it meant a profit of approximately $5,000,000, the original investment in the ships having been about $2,600,000.

Again in February, 1917, the Campagnie Generale Transatlantique, a well-known steamship line, had a 30-days option to purchase the ships for $9,300,000.

Richard G. Wagner, president of the companies, was born in Milwaukee 56 years ago. His father was a German, who changed his name from Wagenknecht. Wagner was educated in Rensselaer Polytechnic institute at Troy, N. Y., and for a period of 12 years thereafter was engaged in the bridge building business. Later he took up the beet sugar industry and engaged in that business for 14 years. In 1914 he left Wisconsin and went to New York.

On Dec. 29, 1914, five months after the European war opened, Wagner sailed for Rotterdam, ostensibly for the purpose of providing for a supply of sugar beet seed. He visited Berlin and then Mulheim, the home of Hugo Stinnes, the wealthy German ship owner and coal operator. Wagner then went to Copenhagen, where he met his cousin, Albert Jensen. Wagner told Mr. Garvan that he was not related to Jensen in any way, yet in letters he had addressed him as "Dear Cousin."

Plans Are Carefully Laid

Jensen was managing director of the Copenhagen Coal & Coke Co., which is owned by Hugo Stinnes. After talking to Jensen, Wagner, as stated in the opinion of the president of the prize court in London, seems to have "transferred his commercial affection from the sweetness of sugar, of which he knew much, to the seductiveness of ships, of which he knew nothing." Wagner told Mr. Garvan that when in Copenhagen he and Jensen made arrangements for the purchase of a fleet of merchant vessels. He said that Jensen was to furnish the money for the ships, and

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that he (Wagner) in turn was to come to this country and organize an American company so as to give American registry to the ships purchased by Jensen. While in Germany Wagner tried to buy an uncompleted tank steamer then building in a German shipyard. He induced the American ambassador to cable to this country to ascertain the attitude of the commissioner of navigation concerning American registry.

Wagner returned to the United States by way of Italy, and on March 20, 1915, he organized in Delaware a corporation known as the American Transatlantic Co., with a capitalization of $200,000. His experience in his native state led him to think that 20 per cent of the authorized capital must be paid in cash in order to enable the company to do business, and so as he supposed, he needed $40,000.

Cables for Money

Wagner cabled to Jensen at Copenhagen for the money, but received no answer. He cabled a second and third time without result. Then Wagner cabled Jensen at a Berlin address. He told Mr. Garvan that he did not know whether that address was the office of Hugo Stinnes or not. However, he received no answer to this cable. Other cable messages were sent to Jensen but still no reply came.

At this point Count von Bernstorff appeared on the scene, and through his intervention by wireless to Berlin the $40,000 which Wagner thought was necessary to organize the American Transatlantic Co. was sent to New York. Wagner represented to American officials that this $40,000 was his own money. He admitted to Mr. Garvan that it had been supplied from abroad.

Jensen had some ships in his own name under the Danish flag. He made plans to buy others, some of them registered in Denmark; others in Norway, Sweden, and Greece. Wagner said he believed that the transfer of the ships to American registry would be simple if they had been purchased from neutrals and had neutral registry prior to the war.

Jensen transferred some of the ships to the American Transatlantic Co., and was about to purchase and transfer others when he was caught by the Danish government while attempting to smuggle copper, represented on the manifest to be sugar, into Germany. For this offense Jensen was sentenced to a term of 60 days, "on ordinary prison fare."

Following Jensen's arrest, he and Wagner found it necessary to get another representative, and curiously enough, Theodor Lahr, of Lenders & Co., Rotterdam, who was also an agent for Hugo Stinnes, was selected. Jensen went to jail and Lahr began to buy more ships for Wagner.

The change in agents made no change in operations. Wagner got news that ships were being constantly added to his fleet. He paid no money for them and apparently no money was asked of him. Altogether ships then worth approximately $2,500,000 were transferred to the American Transatlantic Co., practically no money being paid by Wagner.

For the purpose of covering these transactions, Wagner increased the stock of the American Transatlantic Co. to $2,500,000 and issued practically all of it to himself. He also organized a subsidiary company for each vessel. Another curious coincidence is that this was the same device used by Hugo Stinnes in handling his vessels in Germany. All of the stock in the subsidiary companies was held by the American Transatlantic Co.

Having acquired his fleet of ships, Wagner now sought to register them under the American flag. He met with considerable difficulty, because his agents abroad were unable to convince the American consular officers that the transactions were in good faith and that the ships were entitled to the flag. Wagner got into controversy with the commissioner of navigation, and, with truly Prussian arrogance, sought to bulldoze and deceive him. The commissioner of navigation insisted upon being shown that the American Transatlantic Co. was a *bona fide* American industry. He knew that Jensen had been the Copenhagen agent for Hugo Stinnes, and that he had been sentenced for the attempt to smuggle copper into Germany.

Wagner Becomes Insistent

Wagner's first attitude was that he would tell nothing about his company. He insisted that the American officials must be satisfied since the ships were owned by a company chartered in an American state with officers and directors who were Americans. Both he and his counsel insisted that the actual ownership of the stock of the company had no bearing on the case, and that, under the circumstances, the commissioner of navigation had no alternative but to grant American registry to the ships.

To placate Commissioner Chamberlain, Wagner represented that he personally held all the stock. When the commissioner was curious to know how he had financed the purchase of $2,500,000 worth of ships, he finally admitted that Jensen had really supplied the ships and that he, Wagner, had only a right to purchase 50 per cent of the stock.

Commissioner Chamberlain was not satisfied with this state of affairs and frankly told Wagner that he was suspicious of the whole transaction. Wagner thereupon decided to "eliminate" Jensen, and, on July 9 he sent a cable dispatch to Jensen stating that he had "eliminated" him from the American Transatlantic Co. by sending him his, Wagner's, unsecured promissory notes for $2,654,000. These notes were dated a month prior and were payable at the rate of $500,000 a year for five years. Wagner said he followed up this cabled "elimination" of Jensen by a letter in which he enclosed the notes.

Commissioner Still Suspicious

Having thus "eliminated" Jensen, Wagner went to Commissioner Chamberlain and declared that he was the beneficial owner of the stock. The commissioner was still suspicious and insisted upon seeing more of an American interest in this company before he gave the ships the right to use the American flag.

Shortly afterward Wagner went back to the commissioner's office and said he had paid approximately $1,300,000 in real American money to Jensen, and thus had most effectively "eliminated" him from the American Transatlantic Co.

The commissioner wanted to know where Wagner got this money, and Wagner said he had sold $900,000 worth of stock of the company to American investors. He also said he had sold his own securities and had realized nearly $385,000 more.

Wagner told this story to several departments of this government. He repeated it in private letters and attempted to foist it upon the English prize court. For a time he persisted in this story in his examination by Mr. Garvan, and attempted to give details showing the persons who had invested in the stock and the amounts which each had invested.

Cornered by Mr. Garvan, Wagner finally broke down and confessed that his story about the raising of this money by the sale of stock to investors and the sale of his personal securities was untrue, and that the money had come from his cousin, Edmund Wagenknecht. Wagner told Mr. Garvan of the great difficulty he had experienced in securing American registry for the ships of the American Transatlantic Co., because Commissioner Chamberlain was suspicious of the ownership of the company, and

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because of Jensen's conviction.

"I decided to eliminate him," Wagner said to Mr. Garvan, "by paying him back the money that he had advanced for the ships, and as I was unable to pay the money in cash I sent him my notes for the amounts he had advanced. I cabled him to that effect on July 9 and sent my notes a few days later in a letter."

Wagner then told Mr. Garvan that his cousin, Edmund Wagenknecht met Cousin Jensen on the street in Copenhagen, and that Jensen had told Wagenknecht of Wagner's difficulties in connection with the American Transatlantic Co., and of the struggle that Wagner was having in this country to obtain American registry for the ships. Then, without the slightest warning, the sum of approximately $1,300,000 fell into Wagner's lap. It was sent by Edmund Wagenknecht, who is now in Germany and is on the enemy black list. Jensen is also on this list.

More Money Promised

"On or about July 28," said Wagner, "I received a letter from a relative, Edmund Wagenknecht, who is a native of Uruguay, South America. This letter, however, came from Copenhagen or some city in Sweden. In that letter he told me that he would send some money to take up Jensen's interest. That money arrived at about the same time at the Hanover National bank in New York. I used that money to take up a part of Jensen notes."

The mysterious letter from Cousin Wagenknecht appeared about two weeks after Wagner had sent his notes for $2,600,000 to Jensen, and the $1,300,000 began to "loop the loop." It passed from Copenhagen to a bank at Malmo, Sweden; then to Cousin Wagner at New York, and then through the Bankers Trust Co. and the Equitable Trust Co. back to Copenhagen to Cousin Jensen, in payment of about 50 per cent of Cousin Wagner's notes, some of which were not due on their face for two years.

Asked by Mr. Garvan if he had a copy of the letter sent to him by Wagenknecht, Wagner said that he destroyed it because he did not want it to become publicly known, fearing he would not get American registry for the ships. Mr. Garvan asked if Wagenknecht had requested any security or receipt. Wagner replied that Wagenknecht had asked him to acknowledge the receipt of the $1,300,000, which was done. Wagner told Mr. Garvan that he had destroyed all of the correspondence, both to and from Jensen, relating to the substitution of notes for stock, and when asked why he had done this and why he had destroyed other personal papers, he said that he had always made it a point never to save personal vouchers or correspondence beyond one year and that this correspondence and the vouchers connected therewith were, to his mind, unimportant, in view of the fact that their usefulness had been served.

Wagner took full advantage of his ability to show that money had really left the United States and had been sent to Jensen. He again renewed his drive on the commissioner of navigation and by insisting urgently upon his legal position that the text of our law required registry under the American flag upon a mere showing of record title to a ship in an American company, he finally succeeded in acquiring registry, though Secretary Redfield wrote Wagner that this registry was granted solely because of the technical requirements of the law ,and warned Wagner that the department felt his (Wagner's) conduct throughout had been such as to increase suspicion of the good faith of his ownership of the ships rather than to allay it.

Mr. Garvan had discovered in the files of the company a letter written by Theodor Lahr, under date of Aug. 3, 1915, which is most illuminating. The money had reached Wagner on July 29, 1915, and Lahr under date of Aug. 3 wrote to Wagner asking why certain remittances had not been made by cable "so as to enable quick return of the sums advanced by your bankers." Lahr continued: "It was our intention to show your remittances to the United States consuls at Rotterdam and Copenhagen so as to prove to them also the money really comes from your side." It is obvious from Lahr's letters that Wagner was not returning the money as fast as the "bankers" on the other side had expected he would do it.

Wagner perhaps thought it would look more natural if he made the transmissions in small remittances rather than in the lump sum. His decision clearly gave great anxiety to those who had advanced the money. Lahr, it will be recalled, represented Hugo Stinnes. Wagenknecht was the medium through which the money was forwarded, but Wagner was not able to explain to Mr. Garvan how Lahr happened to know that Wagenknecht had sent the money and happened to be so interested in getting it back.

Four Vessels Are Seized

After obtaining American registry, Wagner assumed that his difficulties were ended, and so he chartered the ships for overseas trade. There were 11 ships altogether, and of these four were seized. The first seizure was of the steamship SAGINAW, formerly the SOLVEIG, by the French, on June 6, 1915. The others were seized by the British, the steamship HOCKING on Oct. 28, 1915, the KANKAKEE on Oct. 31, 1915, and the GENESEE on Nov. 6, 1915.

These seizures by the British were made the basis of a master effort of Bernstorff's German propagandists in the United States. Resort was had to every device to arouse hatred and ill feeling in this country against Great Britain. Under the direction of von Bernstorff, the agitation assumed nation-wide proportions. Wagner, a native born American, persisted in his statements that the $1,300,000 sent to Jensen was American money, and claimed that his "American investors" were entitled to protection, and left nothing undone to take advantage of this agitation against the British.

Being faced with difficulties due to the obviously German origin of his directors, Wagner sought to get men with American names to act as directors for his companies, offering to place stock in their names. He sent out a form letter, which Mr. Garvan discovered in Wagner's files. Edward B. Elcock, Chicago, was one of those who received this letter. Mr. Elcock is a loyal American citizen, and refused to be made a party to Wagner's scheme. He told him so in unmistakable terms. The correspondence

Wagner in Trouble

AFTER Wagner had acquired a fleet of ships, he sought to transfer them to American registry. Here his troubles began. He met with considerable difficulty, owing to the fact that his agents in Europe were unable to convince the American consular officers that the transactions were in good faith, and that the ships were entitled to the American flag.

Wagner got into a controversy with the commissioner of navigation and, with typical Prussian arrogance, sought to bulldoze and deceive. The commissioner insisted upon being shown that the American Transatlantic Co. was a bona fide American industry. He was aware of the fact that Jensen had been the Copenhagen agent for Hugo Stinnes and that he had been sentenced for an attempt to smuggle copper into Germany. For this reason he, naturally, was suspicious of Wagner.

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between Wagner and Mr. Elcock follows:

AMERICAN TRANSATLANTIC CO.

October 30, 1915.

Mr. Edward B. Elcock,
c/o Hansell, Elcock Co.,
Chicago, Illinois.

Dear Ed:

Last January while I was in Europe, a proposition was put up to me by some Danish parties to go into the ocean steamship business which on account of the war is very profitable.

The plan was to purchase neutral ships, place them under the American flag and operate them from New York strictly as a legitimate money making proposition. The American flag was desired because it was feared that all Europe might become embroiled in the war.

Because the beet sugar business without tariff protection has no future, I consented to undertake the New York end of the proposition and am now in charge of the American Transatlantic Co., a Delaware corporation, which I organized upon my return to this country. The capital stock of the company is $2,500,000—all paid in and, of course, nonassessable, and at present this stock is all in my control.

For certain confidential reasons, it is desirable that a part of this stock should be distributed, and I have taken the liberty of putting $200,000 in your name. There is no liability of any kind or nature connected with the ownership of this stock and the only question that may come up is whether or not you own it and according to the records, you do. The question of how much or in what manner you paid for it concerns no one and need not be answered. The fact that the records show it to be in your name and you admit it, serves my purpose.

Inquiry as to the American citizenship of the owners of the stock of the American Transatlantic Co. may come up in connection with one of our steamships, the SAGINAW, seized by the French government and now in the French prize court. This ship was purchased for delivery to our company at Marseilles, France, from its former Norwegian owner while in transit to Marseilles with a cargo of merchandise for the French government. After delivery to us at Marseilles, it was held on suspicion that there was a German interest in the ownership. I will have to show that the ship is all American owned and for that purpose want your name as a stockholder. That is all there is to it. Now, if for any reason you disapprove of my action and want your name removed from the list of stockholders, frankly write me to that effect and I will promptly transfer the stock. The stock is in one certificate for 2000 shares.

The company now owns 11 steamers free and clear of any incumbrance, and they represent a value of more than $3,000,000. All of the ships were always under neutral flags and were purchased direct from neutral owners. None of the stock in the company was ever in the name of a citizen of any of the belligerent nations. There is, therefore, no valid reason for seizing this ship.

Very sincerely yours,
(Signed) R. G. Wagner.

Regards to yourself and Mrs. E.
RGW. J.

P. S.—The officers of the company are: President, R. G. Wagner, vice president, W. J. Berger; secretary and treasurer, J. P. Wagner.

Mr. Elcock did not like the suggestion of Wagner and he frankly told Wagner what he thought of the plan in the following letter:

November
Fourth
Nineteen Fifteen.

Mr. R. G. Wagner,
c/o American Transatlantic Co.,
17 Battery Place, New York, N. Y.

Dear Friend:

Replying to your letter of Oct. 30, 1915, concerning the transfer of $200,000 worth of stock of the American Transatlantic Co. to me, I wish to say that I feel perhaps you had better choose some other person to hold the title to the same, as suggested in your letter.

The question of ownership of this stock will, most likely, come up and I might be called on to make affidavits and other statements which I could not make as the legal and real owner of the stock.

Some of my friends have been caught in similar propositions recently and are having hard work to extricate themselves from the peculiar positions they find themselves in.

My sympathies in this matter, one way or the other, have nothing whatever to do with the decision I have reached and I hope you will feel that I appreciate the confidence reposed in your resting the title to so much property in me.

With kindest regards to you and yours, I remain

Very truly yours,

EDE-KB

Undaunted by this turn down, Wagner endeavored to get Elcock to take a single share of stock, pleading with him to allow the use of his name on the directorate of the company. He sent him this letter:

November 6, 1915.

Mr. Edward Elcock,
c/o Hansell, Elcock Co.,
Chicago, Ill.

Dear Ed:

Just received yours of the 4th instant. You are right in your views that questions relating to the real ownership of so large an amount may arise, and also the question of income taxes may cause you annoyance. I fully appreciate this and will hold the stock in another name.

However, I would like to have your name, because it is not German, on my list of stockholders, and I therefore propose to give you one share, $100, outright for that purpose. In fact, since the seizure of our steamer HOCKING last Monday, of which you may have read in the newspapers, I have mentioned your name as a stockholder without naming the amount of stock.

If you will accept this, then you can in good faith, if called upon, make affidavit that you are a stockholder and that you are an American citizen. If affidavits are necessary, I will have the forms prepared here and will mention no amounts. It will simply show that the stockholders are American citizens.

Yours very sincerely,

Kindly wire me Monday if this is satisfactory.

RGW-J. (Signed) R. G. Wagner.

Mr. Elcock paid no attention to this letter and a week later the persistent Wagner sent another letter as follows:

November 13, 1915.

Mr. Edward Elcock,
c/o Hansell, Elcock Co.,
Chicago, Ill.

Dear Ed:

In order to save time, expense, and annoyance, and to secure the release of our ships seized and held by the belligerent European nations, and to prevent further seizures, it is desirable that I submit affidavits from all of the stockholders that they are American citizens.

I therefore enclose a blank form of affidavit which does not disclose the amount of stock held, but simply states the facts that you do hold stock in your name and that there is no other interest, present or prospective, in such stock, and that you are a citizen of the United States.

There is no possibility in making this affidavit that you will suffer any annoyance, loss or expense, and I therefore earnestly request that you have it executed at your earliest convenience and forward to our New York office. I will thank you to telegraph me personally on receipt of this letter as follows: "Letter received. Will (or will not) forward document."

Yours very sincerely,

RGW. J. (Signed) R. G. Wagner.

To this letter, Mr. Elcock replied:

November
Sixteenth,
Nineteen Fifteen.

Mr. R. G. Wagner,
New York, N. Y.

Dear Richard:

I wish to acknowledge receipt of your leters of November 6 and 13, relative to the ownership of $100 worth of stock in the American Transatlantic Co., also certificate of share of stock and blank form to be filled out.

As much as I appreciate your friendship, it is impossible for me to accept this certificate, knowing what I do about your new enterprise, and regret that I will have to return same herewith. My decision in doing this is entirely apart from the standpoint of our friendship, and hope that you will appreciate my position, as I could not, even for you, accept this stock. My views are entirely at variance with the view you take of this matter.

Sincerely yours,

EGE-KR
Encl.

Wagner's final letter to Elcock was as follows:

November 18, 1915.

Mr. E. G. Elcock,
Hansell-Elcock Co.,
Chicago, Ill.

Dear Edward:

Of course I was somewhat surprised when I received your letter of

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the 16 this morning, but I realize now that you had not sufficient explanation in the matter and that you are therefore laboring under a misapprehension as to the real status of the request I made and to show you that it was entirely legitimate, I will explain as follows:

The original understanding I had with the Danish interests was that for any moneys advanced by them for the purchase of ships, they were to receive stock in the company. They were willing to furnish by far the greatest portion of the capital, but because I did not want to hold only the small end of the bag, I was privileged to subscribe for my friends and myself not to exceed 50 per cent of the capital.

Ships were scarce and opportunities to buy them had to be promptly embraced, and accordingly the Danish people purchased and paid for in the name of the American Transatlantic Co. eleven steamers that cost approximately $2,500,000. I did not proceed to interest American capital, because American registry was denied these ships for a long time and I did not want to induce Americans to invest until I was sure of the American flag.

Will Still Shake the Dice

American registry was denied because the Danish gentleman, Mr. Albert Jensen, who advanced the money for the purchase of the ships in Denmark, attempted to smuggle copper from Denmark to Germany after I had left and was arrested, because the Danish government had an embargo on exporting copper. There was, of course, all kinds of smuggling going on because it was profitable, but because this man was prominent politically, his case was widely published and became known in England and also in Washington and when the ship registry question came up, it was claimed by England that Mr. Jensen had secured part of the money with which he paid for the ships from German interests and that was the reason American registry was temporarily denied.

In the meantime the ships were idle and I had incurred considerable personal expense and was losing valuable time. I finally decided, on advice of my attorney, that I would not issue any stock to Mr. Jensen, or in fact to any foreign interests, and as the matter was entirely in my power I compelled the Danish interests to accept my notes, running from one to five years, for all moneys they had advanced. I thereupon issued the stock to myself and am, therefore, the *bona fide* owner of same. All of this has been explained by me to the authorities at Washington.

With this explanation, I trust you will understand that I did not request you to lend your support to any scheme that was anything but strictly legitimate. I wanted you interested because of my friends at home, who have taken an interest, have German names and I wanted some other names to help overcome the suspicion that this is a German owned corporation.

While the above explanation undoubtedly will change your views concerning my enterprise, I do not wish to press you in the matter, but I still would very much like to have you reconsider your decision, accept the certificate and execute the affidavit sent you in my previous letter.

However, if there are other reasons, private to yourself, that may be an objection to accommodating me in this mater, then do not mention them but just forget the request I made and I will drop in at Memlers just the same at the first opportunity and throw the dice with you for lunch.

Sincerely yours,
R. G. Wagner.

Elcock refused to be snared. Wagner succeeded, however, in persuading other persons to allow the use of their names as directors and stockholders. He testified before Mr. Garvan that the shares so issued were held by him and that substantially no money was paid by any of the stockholders whose names had been given to our governmental departments. Despite his attempted showing of American stockholders and American moneys invested he was unsuccessful before the British prize court and his three ships were condemned.

It was shown in the prize court record that in the case of one of the steamers purchased by Jensen, the company known as Hugo Stinnes, Ltd., of London, not only supplied the original deposit money, but also the balance of the purchase price of the ship; and as respects a second of the ships purchased by Jensen for the American Transatlantic Co., Hugo Stinnes, Ltd. also paid the deposit money and arranged to have the balance of the purchase paid by the Copenhagen Coal & Coke Co., of which Jensen was the manager, and the stock of which was wholly owned by Hugo Stinnes, according to the testimony of Stinnes' London manager. Mr. Garvan's investigations showed that the same plan of purchasing neutral ships, and in case of war transferring them to another flag, had been discussed between the manager of Stinnes' London house and a firm of attorneys prior to the outbreak of the war.

For the purpose of separating the ownership of the seven remaining ships of his fleet from the four which had been seized by the British and French, Wagner organized in 1917 a new company known as the Foreign Transport & Mercantile Co. This company was organized with a capital of $2,500,000 and the old shares in the American Transatlantic Co. were turned in in consideration of the issue of the same proportions of shares in the new company.

Offers Large Reward

One of the interesting side lights in the investigation was the disclosure that after rumors had been current in shipping circles of the United States that a fleet of American steamers was supplying German raiders and submarines in mid-seas with food and fuel, Wagner inserted a half page advertisement offering $50,000 reward to any one who could produce evidence to show any ships of the American Transatlantic Co. had been used for that purpose. He also at one time offered a reward of $10,000 if any one could show that there was any German ownership in the American Transatlantic Co.

In May, 1917, Wagner induced Representative Cary of Wisconsin to introduce a resolution in congress which read, in part, as follows:

"WHEREAS the majority of the stockholders of the American Transatlantic Co. are American citizens and have invested their money in American ships with the expectation that their property rights would be protected by the government of the United States at all times, and under all circumstances, against aggression, real or fancied by any foreign government; therefore be it

"RESOLVED by the senate and house of representatives of the United States of America in congress assembled, that the secretary of state is hereby requested and directed to report to the congress within a reasonable time what steps have been taken by the government of the United States to protect the ships of the American Transatlantic Co. from the aggression and the interference of any foreign government, either at sea or at any foreign port, while engaged in legitimate trade."

Cousin Jensen in Jail

JENSEN had some ships in his own name under the Danish flag. Some of these he transferred to the American Transatlantic Co. and was preparing to purchase and transfer others when he was caught by the Danish government in an attempt to smuggle copper into Germany. The copper was listed on the ship's manifest as sugar. For this offense, Jensen was sentenced to a term of 60 days on ordinary prison fare.

Following Jensen's arrest, he and Wagner found it necessary to obtain another representative, and curiously enough, Theodor Lahr of Lenders & Co., Rotterdam, who was also an agent for Hugo Stinnes, was selected. The change in agents, however, made no change in operations.

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Motor Trawler is Fully Equipped

Eastern-Built Fishing Craft Has Many Labor Saving Installations for Handling Large Catches—Her Twin Screws Are Driven by Oil Engines

By George S. Hudson

UNIQUE among fishing craft of the north Atlantic is the 140-foot motor trawler PIONEER, owned by the F. C. Pearce Co., Gloucester, Mass., and recently placed in commission. This wooden vessel, besides having the distinction of being the largest trawler propelled by fuel oil motors, has a complete electrical equipment for operating a winch that handles gear, as well as for lighting and for compressing air.

The PIONEER has a capacity of 400,000 pounds of fish and a large cruising radius. Her tanks hold 10,000 gallons of oil and about 3000 gallons of water. Already, the vessel has demonstrated her worth in competition with steam-propelled trawlers of about the same tonnage, landing heavy fares economically and expeditiously, although voyaging over 200 miles to the coast of Nova Scotia and the offshore grounds.

This innovation in the fisheries was designed by Archie Fenton, Gloucester, Mass. The machinery was installed by the Gray, Aldrich Co., Boston. The builders were Tarr & James, Essex, Mass., a town famed as birthplace of the majority of fishing schooners running out of New England.

Two 2-cycle motors, developing about 200 horsepower each, comprise the propelling plant and drive twin 68 x 48-inch propellers, the shafts being 6 inches in diameter and 23 feet long. Twin screws were chosen in order to insure the vessel's ease of handling when hauling the trawl at the end of 400 fathoms of steel cable. The ground section of the net is 200 feet long and supported at the ends by huge runners. In practice it has developed that the PIONEER can be turned on her heel, a consideration which proves invaluable as compared with single-screw installation almost universal in steam trawlers over 100 feet in length.

A 100 horsepower fuel oil motor is connected to a generator which, in turn, operates a motor connected to a specially designed deck winch. A feature of the motor installation is the arrangement for expanding exhaust gases located at the base of the funnel. This device, in reality an iron pot, is supplied with water by the circulating pump. The 8-inch exhaust pipes of the main motors and 6-inch exhaust pipe of the auxiliary motor discharge in the water. Provision against slopping is provided by a deflector plate and by staggering the elbows that admit and direct the gases to the muffler.

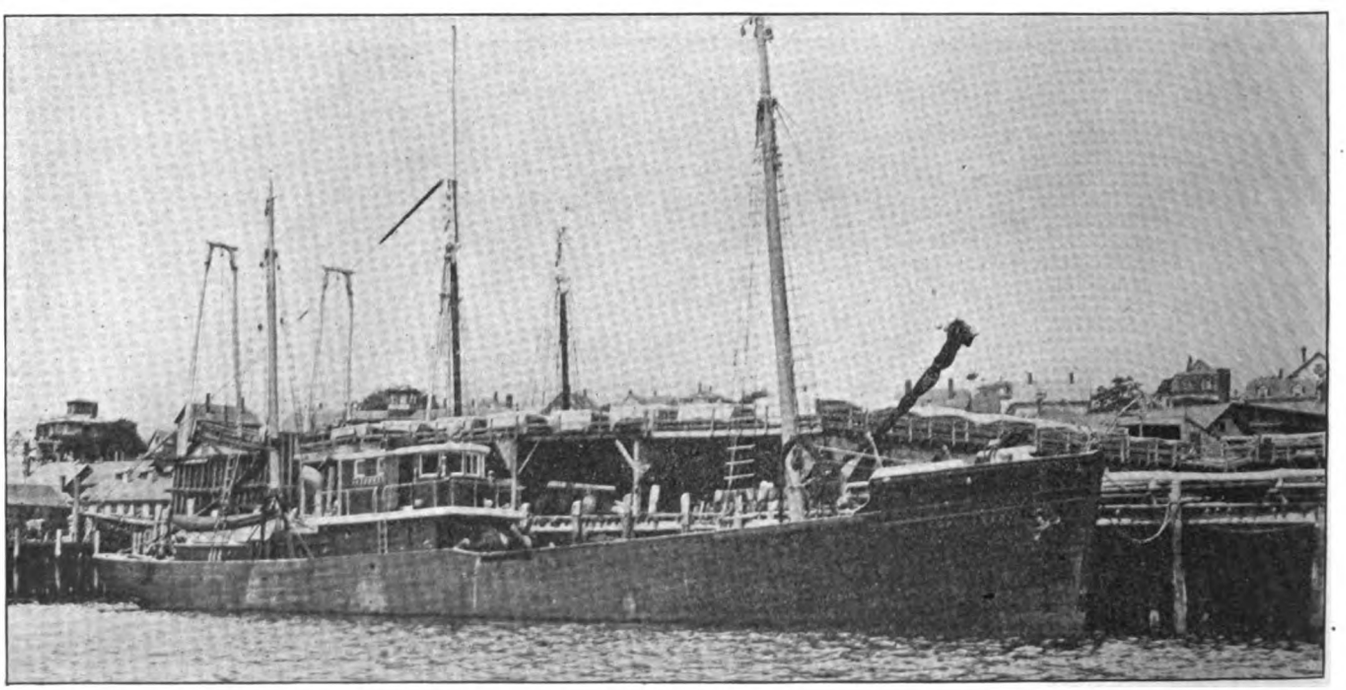
In practice the PIONEER'S muffling device works almost noiselessly, puffs of steam being emitted when the motors have been warmed up. The device

Modern Motor Trawler

WHEN Rudyard Kipling wrote Captains Courageous he graphically and accurately described how fishermen from Massachusetts ports depended wholly on manual labor and favorable winds in making successful fishing voyages.

Modern innovations, however, have lessened the fisherman's labor. Oil engines and twin screws have supplanted sails and quick-acting power winches have replaced manual labor.

The vessel described is a new motor trawler hailing from Boston. She was designed especially to reduce the cost of labor to a minimum and she has demonstrated her worth in competition with steam trawlers of like tonnage in the rapid landing of large catches of cod.



MODERN MOTOR TRAWLER PIONEER READY TO SAIL FOR THE FISHING GROUNDS

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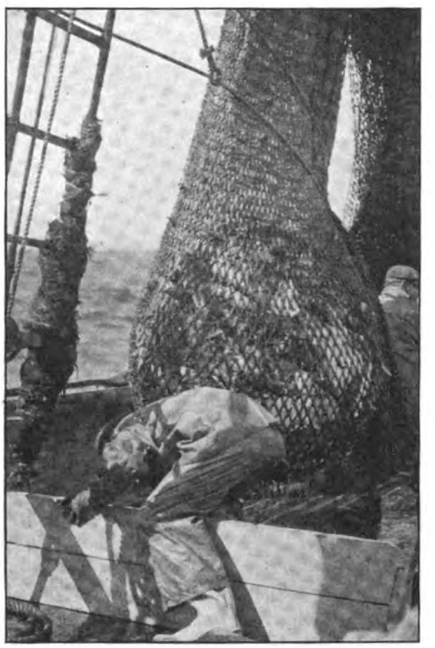
eliminates exhaust lines extending from the manifold to the vessel's counter. This feature eliminates the possibility of a redhot pipe which might set the craft on fire. Again, the PIONEER's run is free for the battery of 10 fuel tanks and ample space for their inspection as well as for an alley providing access to the lazarette.

Under the forecastle head is an air-compressing motor and another motor geared to a winch for handling stores and cargo. Still another motor operates a pump of large capacity. By means of messengers and an arrangement of snatch blocks in connection with the nigger heads of a winch, power in all parts of the vessel is available.

The electricity for power is generated by a direct-current 75-kilowatt, 250-volt generator belted to the 100 horsepower motor previously refered to. Current from the generator is wired to the power switchboard on which is mounted current indicators, a main switch, ground detector and a circuit breaker which protects the generator in event of overload.

The powerboard feeds through a street-car type controller to a 65 horsepower series motor equipped with an electric brake. This motor is geared to the deck winch. The current for lighting is obtained from a 6-kilowatt, 115-volt direct-current generator coupled to the 10 horsepower motor. This generator is used both for lighting the vessel and charging the 120-ampere hour storage battery unit. This battery supplies the lighting when the generator is not in operation.



TRAWL NET CONTAINING SEVERAL TONS OF COD

In all, about 30 lights for general illumination are included in the equipment.

The PIONEER will be given wireless apparatus with which her skipper may keep in touch with the owners, relative to his catch and the needs of the market or, should emergency arise, send out an appeal for assistance. The vessel is commanded by Capt. Fred Thompson, veteran in the fishery, and carries a crew of 20.

Move New York Offices

The New York offices of the Penton Publishing Co., publisher of THE MARINE REVIEW, *The Iron Trade Review, The Daily Iron Trade and Metal Market Report, The Foundry* and *Power Boating* have been moved from the West street building to rooms 2203 to 2206, St. Paul building, 220 Broadway. The organization representing the Penton company in the east has grown so rapidly it was found necessary to provide larger quarters.

The True Status of Diesel Engines

By J. C. Shaw

Engineer, William Cramp & Sons Ship & Engine Building Co.

A letter to the editor of The Marine Review

THE article, "Rational Design of an Oil Engine," by John F. Wentworth, in the August number of THE MARINE REVIEW, is interesting. However, several of the suggestions he makes are not entirely new as experimenting with low compression automatic ignition engines along these lines has been done by others in this country and abroad. The difficulties of such a system are fairly well known.

The statement that the oil engine is in swaddling clothes may be applicable to this type of oil engine but it certainly is not in conformity with results of diesel engines as used in modern submarines and in many large foreign motorships. The suggestion that we should disregard the highly developed foreign designs, which owe their successes more to design details, proper selection of materials and excellent workmanship, rather than to any new theories involved, and that we work from supposedly independent sources, is not in accordance with sound engineering methods for practical advancement. The development of the Liberty motor affords an excellent parallel example, as it claims nothing original in theory or principle and was arrived at by a close study of details of existing aviation engines and chiefly foreign makes.

The Wentworth engine has no reason for being classed as a low compression diesel, for it does not produce the card of the diesel characterized by graduated combustion and constant pressure. It is, as the author states, an explosion engine, that is working on the constant volume or Otto cycle. The actual card should be almost identical with that obtained on most hot bulb engines. One is led to infer from the drawings published, that an actual engine was built and tested, and, if such is the case, it is regretted that no test data was published to substantiate the various claims.

Ignition Disturbances

The greatest defect of a low compression engine, as advocated by Wentworth, for practical marine purposes, is the small margin of automatic ignition which is subject to be disturbed at reduced powers and speeds. Such devices as throttling the jacket water and inlet air then becomes a necessity and not optional to improve the efficiency as claimed. Throttling the jacket water to suit the running conditions is impractical, due to complication, and dangerous as it invites heat troubles especially in the larger size engines. This has the effect of keeping the compression temperature up and keeping highly heated, for assisting ignition, those partly jacketed or wholly unjacketed parts. The practice of throttling the inlet air has the effect of causing hot exhaust gases to be drawn back into the cylinder through overcoming the initial compression in the exhaust spring and no doubt explains the anomaly recorded by Wentworth in working with lower compression pressures at reduced powers.

The claim for an increased unit capacity of 7 per cent over that of the pure diesel by scavenging the burnt gases from the larger clearance space is questionable. The lower compression temperature resulting thereby and the cooling effect on the heated parts would most probably adversely affect the ignition. The retention of 15 to 20 per cent hot gases in the larger clearance of the low compression engine materially

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aids automatic ignition but lowers the volumetric efficiency as compared with a diesel. Also a larger excess air should be required than in the diesel due to the greater delution.

The constant volume engine is not adapted to as large powers per cylinder, about 100 horsepower maximum, as the constant pressure engine. The chief reason for this is the racking action produced by the sudden rise of pressure, or explosion near dead center. This maximum pressure, depending on timing and load, often exceeds that in the diesel which latter is from 455 to 485 pounds, according to best European practice. In this respect it is difficult to reconcile the comparison of stress diagrams and bending stresses shown in Fig. 3 and 4 of the article referred to.

Complication Eliminated

In the pure diesel, and in particular the four cycle, we have that condition of certain automatic ignition, without undue complication, for all adverse conditions, whether starting up cold or running light or slow speed. It insures that complete combustion at all times and freedom from smoke which is so essential for continuous uninterrupted service required at sea. Furthermore the diesel engine meets the marine requirements of larger powers per cylinder due to its uniform combustion pressure under all conditions.

The suggestion of using steam, as advocated, in connection with the oil engine would be to introduce all the short comings of steam propulsion in addition, and would complicate control. The usual standby losses and the inability to get under way quickly would be the same as in the ordinary Scotch boiler steam engine installation. Starting and maneuvering on steam, as suggested, would involve carrying around a large boiler plant, and devising dubious means of getting expeditiously from steam to water in the jackets and from steam to oil injection in the cylinders, or *vice versa*.

The statement that vessels of considerable displacement must have steam on board for auxiliary purposes is not correct. In the Danish motor vessels it is standard practice to install a small low pressure donkey boiler, of about 100 square feet heating surface, for heating purposes in cold weather. This is arranged also to supply steam to a small standby, steam driven, compressor. This compressor is used only when the vessel is new, or has been laid up for sometime, or in case all air in starting resorvoirs has been lost through accident. It supplies starting air to one of the small air bottles of the three auxiliary diesel engines driving generators. This permits the auxiliary sets being started whch in turn supply current to the large motor driven compressor and which latter in turn furnishes low pressure starting air to two large starting air tanks. The small compressor, which may not be used but once during the life of a vessel, could just as well be driven by a small hand started oil or gasoline engine, thus entirely eliminating all trace of steam on board as far as operation is concerned. All auxiliary machinery, including winches and steering gear, is electrically driven on these vessels and which has been found out from experience to be much superior to the customary steam drive in every respect.

The method of introducing the fuel into a stream of air, as proposed by Wentworth, is the same arrangement as used in the Bolinder holt bulb engine. The timing shown in diagram is similar to that of a diesel and it is questioned if this would be satisfactory in a low compression engine where the fuel should all be introduced before dead center for highest efficiency. It is due to the late admission or cut off factor in the diesel cycle, as is well known, that makes an equal efficiency possible in the early admission or Otto cycle with only half the compression. Besides lowering the efficiency, due to theoretical reasons, a late admission in a low compression engine is not favorable to complete combustion as found from actual experience.

It has not been the desire to criticize Mr. Wentworth's article so much as it is to correct any erroneous impressions it may have made in regard to the true status of the diesel engine for marine purposes.

Soo Canal Report

Freight shipments through the Soo canal during August, 1918, show a decrease of 1,177,307 net tons as compared with those of August, 1917. In the past month only 12,789,801 net tons of freight passed through the Soo against 13,967,108 net tons in August, 1917. In spite of this the total shipments for the season up to Sept. 1 still show an increase over the shipments for the same period in 1917. The movement of freight passing through the canal up to Sept. 1, 1917, amounted to 49,908,500 net tons, while in the corresponding period this year the movement totals 50,400,698 net tons.

The August movement also shows a decrease as compared with that of the previous month. The July freight movement through the canal amounted to 13,362,344 net tons, or 572,543 net tons more than the August movement. The smaller movement in August can be partly explained by a strike on the Superior, Wis., ore docks. The strike also partly explains the falling off in ore shipments eastbound through the canal during August. These were only 9,507,067 net tons as compared to 10,410,857 net tons in July.

Detailed shipments were as follows:

EAST BOUND

	To Sept. 1, 1917	To Sept., 1918
Lumber, M ft. b. m.....	216,422	192,337
Flour, barrels	4,152,259	4,370,454
Wheat, bushels	86,202,329	12,746,942
Grain, bushels	44,843,224	14,850,305
Copper, net tons	75,342	53,004
Iron ore, net tons.....	35,476,517	38,734,187
Pig iron, net tons	5,724	.....
Stone	.....	10,582
Gen. mer., net tons	133,640	35,120
Passengers, number	15,056	13,812

WEST BOUND

Flour, barrels	80	.....
Grain, bushels	1,475	.....
Coal, soft, net tons	7,707,044	8,254,285
Coal, hard, net tons	1,418,285	968,421
Iron ore, net tons	38,005	74,928
Mfgd., iron and steel, net tons	63,698	24,438
Salt, net tons	338,153	52,615
Oil, net tons	.....	209,266
Stone, net tons	.....	313,289
Gen. merch., net tons ...	752,852	237,125
Passengers, number	16,012	14,185

SUMMARY

Vessel passages, number..	13,121	12,390
Registered tonnage, net..	37,723,681	37,392,752
Freight:		
Eastbound, net tons	39,878,351	40,266,331
Westbound, net tons	10,030,149	10,134,367
Total freight, net tons..	49,908,500	50,400,698

August Ore Shipments

Following two record months, ore shipments for August showed a decrease which lowers the 1918 advantage over 1917 from 3,232,165 tons to 2,810,710 tons. The shipments from upper lake ports in August, 1918, amounted to 9,725,331 tons as compared with 10,146,786 tons in August, 1917, a decline of 421,455 tons. Reasons for the decrease can be found in the heavier coal and grain shipments in August.

The August slump follows a huge shipment in July amounting to 10,659,203 tons, or 933,872 tons greater than last month's record. The following table shows the amount of ore shipped from upper lake ports and the total shipments from each port up to Sept. 1.

Port	August, 1918	To Sept. 1 1918
Escanaba	1,168,604	4,011,481
Marquette	592,073	2,276,092
Ashland	1,209,394	4,582,509
Superior	2,146,689	9,197,933
Duluth	3,243,806	13,156,893
Two Harbors	1,364,765	6,109,356
Total	9,725,331	39,334,264
1918 decrease	421,455	
1918 increase		2,810,710

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Marine News in a Personal Way

Intimate Gossip About What Leaders in the Maritime World Are Doing

R. M. CALKINS, vice president of the Chicago, Milwaukee & St. Paul railroad and for nine years traffic manager at Seattle, has resigned for the purpose of devoting his energy to shipbuilding and to other interests. Mr. Calkins has been prominently identified with the building up of the immense Oriental trade which the Milwaukee handles in connection with the Osaka Shosen Kaisha. He is interested in the Patterson-McDonald shipyard at Seattle and through him the Australian government last year placed contracts for the construction of 15 wooden steamers, several of which have already been delivered.

* * *

FINN HANNEVIG, brother of Christoffer Hannevig, president of the Pusey & Jones Co., has become vice president of the company. He is now manager of the Wilmington, Del., plant, succeeding C. STEWART LEE, who has severed his connection with the company to devote his time to other duties.

* * *

EDWARD BEALE MCLEAN has been elected a director of the Virginia Shipbuilding Corp, a subsidiary of the United States Steamship Co. The Virginia corporation is now building 12 9400-ton steel ships for the shipping board at Alexandria, Va. Mr. McLean is editor and owner of the *Washington Post* and *Cincinnati Enquirer*.

* * *

CHARLES SKENTELBERY, marine superintendent of the New England Fuel & Transportation Co., Boston, for the past 11 years, has resigned his position and and has become associated with the Warren Transportation Co., Boston, as general manager. GEORGE E. WARREN is president of the Warren company, GEORGE P. OSWALD, vice president, and GEORGE W. ANDERSON, treasurer.

* * *

J. H. ROSSITER, director of operations for the Emergency Fleet corporation, recently stated, while in Los Angeles, Cal., that the government would build a drydock in San Pedro, to aid in warship building in that vicinity which would represent the expenditure of $1,000,000.

* * *

GEORGE D. BRITTAIN, secretary-treasurer of the Mobile Shipbuilding Co., Mobile, Ala., has been made treasurer of the Birmingham Steel Corp., Birmingham, Ala., formerly the Armor Iron & Steel Co.

* * *

JAMES S. KEIGHTLY, who has been in charge of the purchasing department of the Great Lakes Engineering Works, Detroit, for a number of years, has resigned, and has been succeeded by E. C. KERRIGAN, who has received the appointment of general purchasing agent.

* * *

M. E. ALLEN, a structural engineer, has become affiliated with the Mobile Shipbuilding Co., Mobile, Ala. R. W. BAILY, mechanical engineer, is associated with the Birmingham Steel Corp., Birmingham, Ala. These two formerly were located in Chicago as the Baily & Allen Co. The Chicago office has been discontinued for the duration of the war. Arrangements have been made with GEORGE GIBBS, First National bank building, Milwaukee, to handle the work of that office.

* * *

J. RODGERS FLANNERY, of Pittsburgh, who has been in charge of the housing projects for the government shipbuilding yards, has been appointed director of purchases of supplies and equipment for the railroads of the United States.

* * *

WILLIAM L. FLETCHER, who has been sales manager of Cutting & Washington, Inc., Boston, manufacturer of wireless equipment, has accepted a position with the United States department of labor as a special investigator. Mr. Fletcher will remain in the employ of the government until peace is declared.

* * *

E. S. DAVIS, formerly vice president of the Crown Brass Co., is now engaged in the supply business under the name of E. S. Davis, Inc., with offices in the Singer building, New York. The corporation will handle an extensive line of marine and railroad supplies.

* * *

LUTHER D. LOVEKIN, who was recently appointed a vice president of the American International Shipbuilding Corp., is a marine engineer as well as an inventor. Mr. Lovekin's first step of prominence in the shipbuilding field was 18 years ago when he was made chief draftsman of the William Cramp & Son Ship & Engine Building Co., Philadelphia. He was not long in that postion when the newly-formed New York Shipbuilding Co., Camden, N. J., offered him the position of chief engineer, which position he held for a number of years. Less than a year ago Mr. Lovekin was appointed to the position of consulting engineer of the American International Shipbuilding Corp.

* * *

C. BRADFORD FRALEY was recently appointed assistant secretary of the Emergency Fleet corporation.

* * *

W. J. HAYMAN has been appointed general lumber superintendent of the Emergency Fleet corporation, in charge of lumber yards, logging operations, etc.

* * *

ROBERT J. GOMEZ, for 14 years identified with the shipping business, and more recently with the Wardrop West African line, has secured an interest in the Linton Line, Inc., of 74 Broadway, New York, and will occupy the position of general manager.

* * *

GEORGE A. ARMES, former chief engineer of the Union Iron Works Co., San Francisco, is now affiliated in an important capacity with the Moore Shipbuilding Co., Oakland, Cal.

* * *

H. L. HOPWOOD, industrial lawyer, Columbus, O., was instrumental in the sale of the plant of the Enterprise Co., Columbiana, O., recently purchased by a group of New York men. The company has been producing steam and gas engines, wood working and special machinery. The plant will be used for the manufacture of marine engines for the government. The physical valuation of the plant is approximately $350,000.

* * *

W. J. BROWN, 111 Broadway, New York, has been appointed local representative of the Bethlehem Shipbuilding Corp.

* * *

WILLIAM M. BAILEY, recently connected with the Federal Shipbuilding Co., Kearney, N. J., has become vice president of Fulton Steel Corp., New York city.

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Photographs From Far and Near

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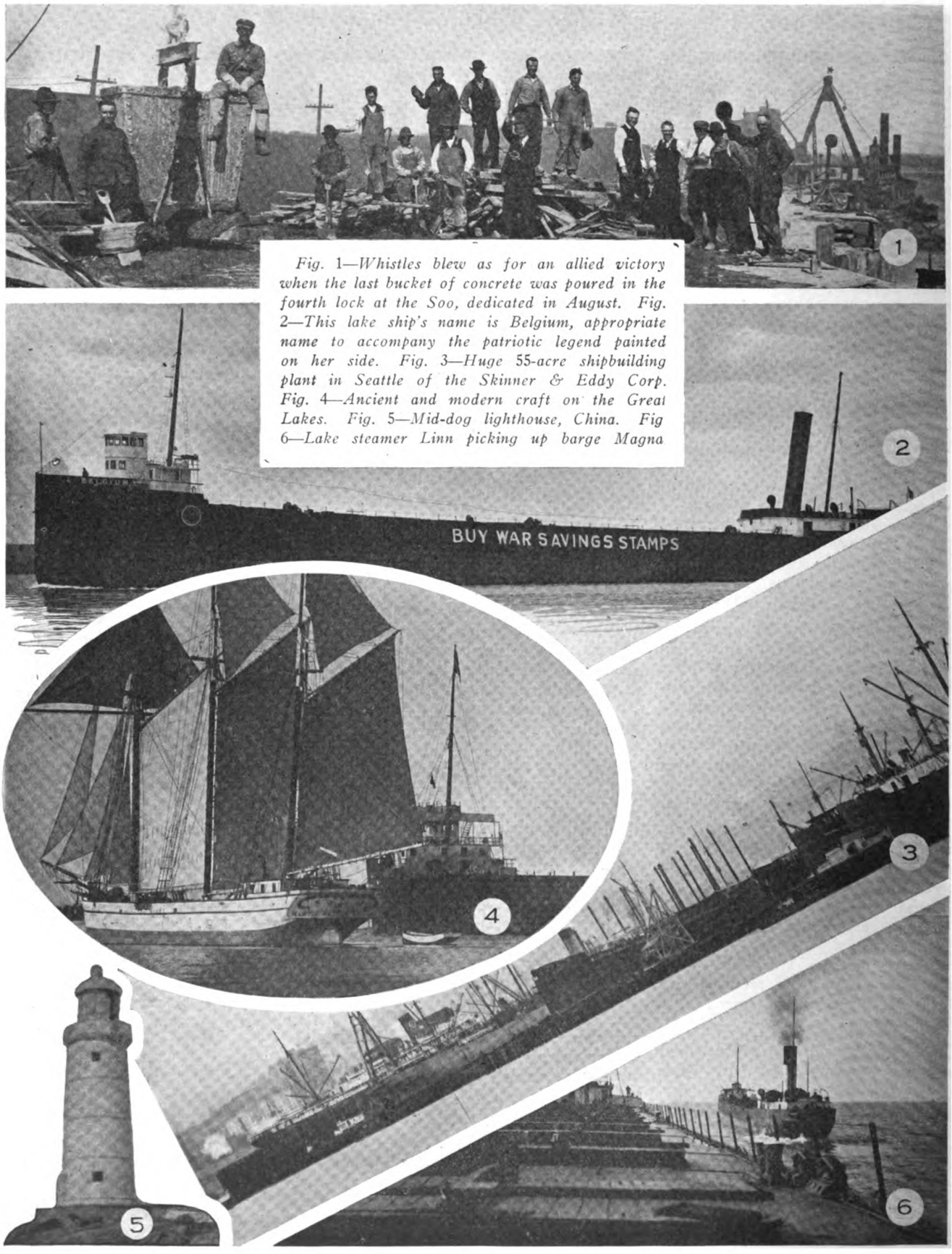

Fig. 1—Whistles blew as for an allied victory when the last bucket of concrete was poured in the fourth lock at the Soo, dedicated in August. Fig. 2—This lake ship's name is Belgium, appropriate name to accompany the patriotic legend painted on her side. Fig. 3—Huge 55-acre shipbuilding plant in Seattle of the Skinner & Eddy Corp. Fig. 4—Ancient and modern craft on the Great Lakes. Fig. 5—Mid-dog lighthouse, China. Fig 6—Lake steamer Linn picking up barge Magna

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Latest Marine News in Pictures

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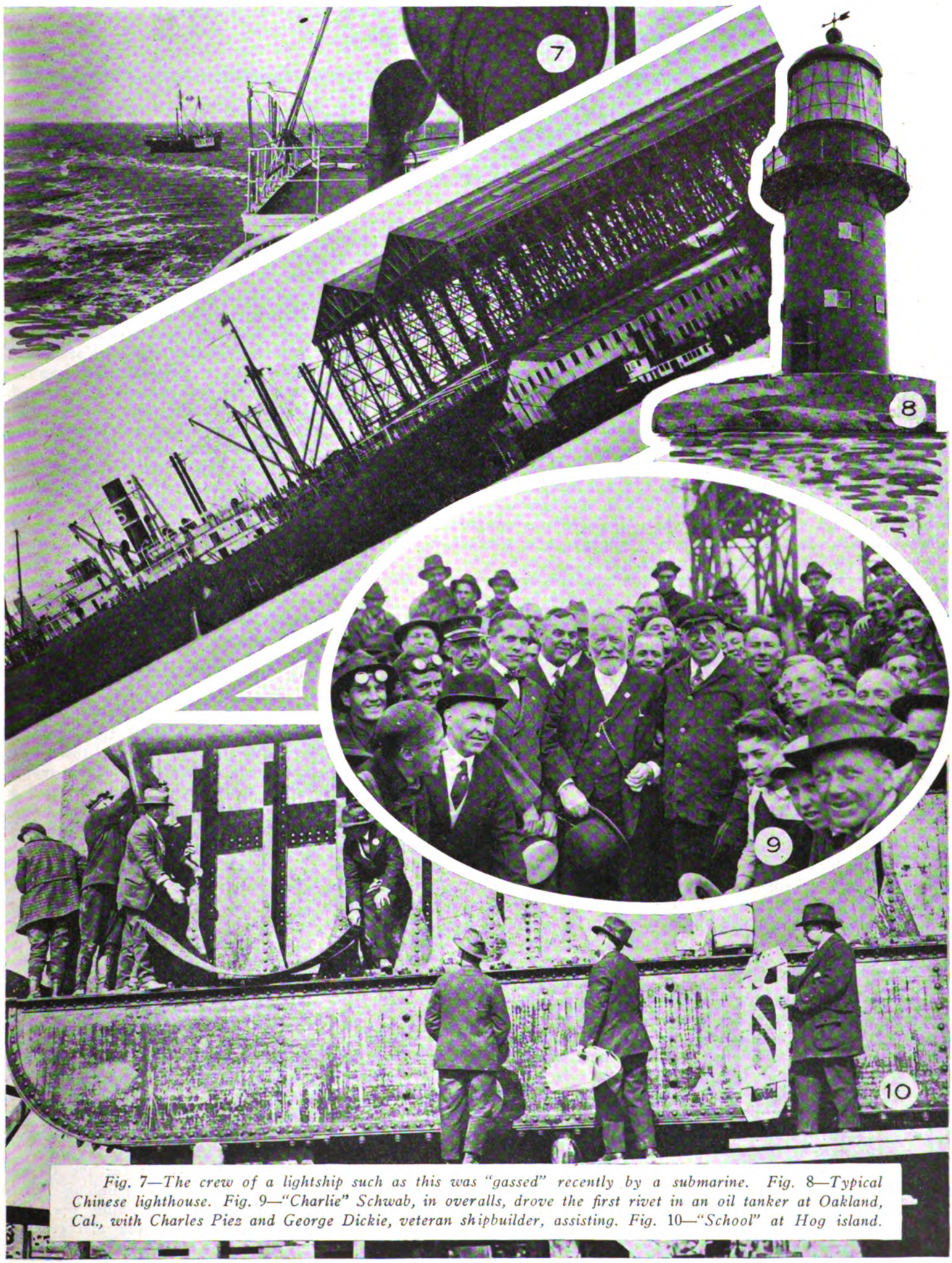

Fig. 7—The crew of a lightship such as this was "gassed" recently by a submarine. Fig. 8—Typical Chinese lighthouse. Fig. 9—"Charlie" Schwab, in overalls, drove the first rivet in an oil tanker at Oakland, Cal., with Charles Piez and George Dickie, veteran shipbuilder, assisting. Fig. 10—"School" at Hog island.

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In the Traffic Manager's Office

A Review of the Month on Coasts and Lakes—Useful Pointers for the Men Who Get the Business

West Coast Charterers Face Problem

By Robert C. Hill

ALTHOUGH lumber freights from the Pacific coast have been stabilized by the fixing of maximum rates by the United States government, the situation with reference to Japanese tonnage is most chaotic at the present time.

The scarcity of vessels in the Oriental trade has been greatly intensified by the tonnage turned over by the Japanese government to the United States and the natural result has been a rapid advance in the prices being paid for Japanese ships chartered either by voyage or on the time basis.

Advices from the Orient indicate that the demand for ships and the existing shortage have caused a sharp advance in the price being paid for tramps. New high records have been established and where it will end no one can predict, unless governmental regulation is adopted by the Japanese.

Americans Are Outbid

Under present conditions, American charterers and exporters are unable to bid for Japanese bottoms for the reason that they are prohibited from bidding more than half the amount being offered by Japanese charterers. It is a serious problem and one that is causing grave concern among the leading chartering firms on the north Pacific coast.

All charters closed by American firms are subject to the approval of the United States shipping board, which has set a maximum of 41 shillings 6 pence, or approximately $10.35, for time charters. When it is stated that recently charters have been closed in the Orient at from 40 to 45 yen, or the equivalent of from $20 to $22.75 per deadweight ton per month, it can easily be seen that the American cannot compete when, by law, he is stopped from bidding more than half that being paid by his Oriental competitors.

Further Difficulties

Another problem facing the American charterer is the taking by the United States government of neutral tonnage under time charter to American firms. For instance, firms on the Pacific coast have had Norwegian ships under long-time charter only to have them taken over by the government as soon as they arrive at a United States port. The patriotic American is not complaining, but this situation illustrates under what uncertain conditions he is compelled to operate.

Still another serious question at present facing charterers and exporters is the influence of increased railroad rates in this country upon charters. When the higher railroad schedule was announced, those interested in overseas commerce feared that the increased rail rates would materially reduce trade between this country and the Orient, inasmuch as no provision had been made for export and import rates, as under former conditions, when import and export business was handled at a lesser rate than domestic freight. Some of the original advances exceeded 400 per cent. The strong protest entered has borne fruit and an import-export schedule became effective July 1. Not all the items in the Oriental trade are included in the reductions but such cargo as oils, silk, copra and matting coming in, and iron and steel moving out, constituting the bulk of the export and import business, will take a reduced rate by rail. The general increase of the import and export rate is about 25 per cent over the former schedule, in proportion to the general advance. Just what effect this increase will have on charter rates no one knows, but there will be a general readjustment within the next few months.

Japanese Hold is Firm

The entire situation is giving the Japanese a firmer hold on the trans-pacific trade. Japanese charterers are evidently free to bid for their own vessels on a market based on supply and demand while the American is handicapped by maximum rates which at present are not more than half the market value.

Prior to the war, the average time charter was made on a basis of from 2 shillings 9 pence to 4 shillings per deadweight ton per month, or $1 per ton per month or less, according to supply and demand. The latest charters negotiated in the Orient were made at undreamed of rates. One vessel was fixed at 40 yen or $20 per ton per month. Still another was taken at a new high record of 45½ yen per month, for nine months for trade routes east of Calcutta. This figures out about $22.75 per ton per month against the American maximum of $10.35.

Time charter rates for the Orient have been steadily climbing since early in 1915. Following the outbreak of the war, the market was

How Lumber Rates From North Pacific Ports Have Advanced

Destination	July 1, 1918	Jan. 1, 1918	July 1, 1917	July 1, 1914
San Francisco	$7.00–$7.50	$7.00	$7.00	$3.50
Southern California	8.00– 8.50	8.00	8.00	4.00
Hawaiian Islands	20.00–22.00	20.00	18.00–19.00	6.00
New Zealand and Sydney, NSW.	42.50–45.00	42.50	125s	37/6–40/0s
Melbourne, Adelaide	$45.00	45.00	140s	42/6–45/0s
West coast	45.00	45.00	$40.00	40/0–46/3s
South Africa	320s	300s	260s	62/6–65/0s

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stagnant due to general uncertainty and the fear of raiders in the Pacific. Then prices began to advance. For a long time the market hovered at the then unheard of level of 28 or 30 shillings or $7 to $7.50 per month. Rapidly it rose to 45 shillings, then to 60 shillings, later 72 shillings until the highest point recorded is that mentioned above, 45½ yen or 91 shillings 6 pence.

With the insistent demands for ships in the Atlantic, with the taking by the United States of several hundred thousand tons of Japanese tonnage, and the heavy movement of freight on the Pacific, it may be assumed that charter rates are likely to continue upward, unless governmental regulation is adopted by the Japanese. The entire situation is chaotic and with embargo regulations, scarcity of tonnage, the threat of commandeering and constantly ascending costs of doing business, the lot of charterer, exporter and importer is hard.

Inasmuch as the United States and Japanese governments have arrived at an understanding on other phases of shipping, it would not be surprising if the Tokio government were to regulate charter rates. Such an action would be greatly welcomed by Americans interested in the Oriental trade. Governmental control in this country is tightening and it is not assumed that the United States will continue to permit its citizens to compete for foreign trade under conditions imposing so severe a handicap.

Freight rates have risen with charter rates. The average rates from the Pacific coast to Japan at present range from $30 to $32.50 per ton while the average eastbound rate is from $50 to $55. The differential is regulated by the balance of trade but this illustrates the advantage accruing to the Japanese importer as against the American.

Prior to the war, $10 was considered a high rate for lumber to the Far East. Operators are now asking $45 per 1000 feet to Chinese ports and recently this price was paid for a shipment to Japan. Ordinarily, shipowners refuse lumber when other cargo is available but the difference in rates on this commodity illustrates the great increase. Prior to the war $3.50 per ton was considered an average rate on flour and during a rate war some years ago, flour was freighted to Japan for $1 per ton. While none of this cargo is now moving to the Far East, the rate now would be from $30 to $35 per ton.

American Ships in Demand

There is an insistent demand for American-built ships of all classes but the regulations of the government forbid the transfer to foreign flags for the period of the war. In some instances, permission has been given to transfer ownership to foreign buyers with the provision that the ships must be operated under the American flag, a license to this effect being issued. Were Japanese registry possible, many vessels under the American flag now on this coast would be sold. Italian and French interests are also in the market for tonnage but the shipping board restrictions are keeping many vessels under the Stars and Stripes.

Regulation of lumber freights from this coast has stabilized the charter market with respect to this commodity which moves in large quantities from Pacific ports. During the last six months, there has been practically no change in these rates because the government established the maximum. For instances, $45 is the going rate per 1000 feet for lumber to Peru and Chile. Had this figure not been set, exporters believe that by this time the freight, based on supply and demand, would have reached at least $60.

Coastwise lumber rates are strong and domestic operators are reaping large profits in this trade. Under normal conditions, these coastwise lumber carriers travel in ballast northbound. However, the demand for space is now so great that they can obtain cargo northbound as well as from Puget sound so that the profits are proportionately increased.

It is noteworthy that since the war began, charter rates have ordinarily been quoted in dollars instead of shillings and pence as had heretofore been the custom with reference to foreign routes. This is taken to indicate the greater influence of the United States in foreign commerce. The accompanying comparative table shows lumber rates per 1000 feet from north Pacific ports for various representative periods. This table is interesting and tells its own story.

How War Has Developed American Ports

By V. G. Iden

WHILE American railroads in the past have maintained differential freight rates between ports to inland points, that differential has always been absorbed by the ship lines bringing freight to or carrying freight from the port in question. This system of port differentials, as it was called, was suddenly disrupted sometime ago by a rate war initiated by the eastern railroads. Unable to settle their differences the roads placed their case before the interstate commerce commission and that body, acting as arbitrator, handed down an opinion several years ago indicating what differentials it thought should prevail between the Atlantic ports.

The case then before the commission brought to light some interesting situations which are even more interesting today in the light of developments brought about by the war. It was shown then that shippers desiring speed used the port of New York despite the fact it was more expensive to ship through New York. Boston was a rival to New York in a way, but Boston lacked the facilities which New York possessed. Philadelphia handled grain and heavy articles, but was hampered by a shallow channel. Baltimore dealt in heavy freight while the southern ports along the Atlantic were more or less deserted.

System Is Changed

Today the idea is to move freight fast, so fast in fact that it congests the ports. Therefore it is obligatory that freight shall be diverted through such Atlantic ports as are not already congested or through such ports as may not result in congestion. This routing of export freight is the duty of the railroad administration. That it may be carried forward properly the director general of railroads has appointed an export control committee, with G. D. Odgen as its chairman. This committee may arbitrarily divert freight to any Atlantic port. Also it may divide the export movement to meet the port facilities offered, to bring about quicker handling of freight, to fill war needs, etc. Its duties are to the railroad administration what the P. A. S. Franklin committee is to the shipping board. Mr. Franklin's committee sees to it that ships operated by the government are most efficiently used and that no time is wasted in port. Mr. Ogden's committee will see to it that the rail equipment engaged in carrying export freight is efficiently used and that it is not congested or delayed at the ports.

These duties might be simple enough were the port conditions in America

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similar to the conditions before the war. But port conditions are no longer stable. They are constantly changing, developing, extending and improving. Therefore the question of freight diversion is one that presents a new point of view each day. It requires constant attention to keep up with the developments brought about by the war. Many of these port changes are but temporary in their character and may disappear when the war is over. More are of a permanent nature and after the war the trend of commerce through the Atlantic ports will be vastly different from what it was before the war. That this is certain to be the case requires the mention of but a few of the port changes which are new under way.

Navy's Plans Are Revised

Navy plans have been revised as to the construction of docks at Norfolk and Philadelphia. According to the latest information but one is to be built at Philadelphia and two at Norfolk. One of these is now under construction and it is believed by naval authorities that it will be ready for use this fall. The length of these docks will be such that any ship which can pass through the Panama canal, where the locks have a limiting length of 1000 feet, can enter either of the two docks which are to built at Norfolk.

Reports are also current in well informed circles that the navy will increase its facilities at Baltimore. The plan outlined is to build a warehouse and depot on a lot 20,000 feet square and to utilize other portions of the pier at the foot of Hughes street. Should the government desire this site the Baltimore authorities are declared to be willing to grant a lease. Several hundred thousand dollars will also be spent on improving the waterfront at Boston and New York. These are simply incidental expenditures by the navy.

The appropriation for the dry dock at Philadelphia is $2,000,000, with $400,000 additional for other expenditures at that port. An appropriation of $3,450,000 in all has been made for the navy yard at Norfolk, of which $2,000,000 is to complete the dry dock under construction, and $500,000 is for waterfront improvements. A drydock for Charleston, S. C., to be limited in cost to $4,000,000 has been provided for, congress making the first appropriation of $1,150,000. New Orleans will have a $30,000 floating crane owned by the navy. These appropriations are all in addition to the several millions which are to be spent on the naval operating base at Hampton Roads.

To accommodate the improvements at Charleston it will be necessary to dredge a channel 1000 feet wide from the navy yard to the sea, which will take in a very large part of the Cooper river, and will be 40 feet at low water. This will make Charleston one of the few very deep ports of the world.

While these facilities are constructed primarily for the navy their potential value to commercial vessels must not be under rated. The vast fleet of merchant ships owned and operated by the Emergency Fleet corporation are really government-owned and their safe keeping and rapid handling is of considerable value to the government. The enlarged and improved facilities of our navy yards are intended to accommodate the enlarged navy of the United States. To that extent the facilities will prevent the naval vessels encroaching upon the docking facilities of our merchant vessels. And on the other hand in the case of emergency it is not unreasonable to expect that one branch of the governmental service would not hesitate to assist another especially in times of peace.

The enlarged facilities at the ports constructed for naval use must prove of great advantage to the United States. If the naval facilities may be expected to be a commercial advantage after the war, it might with even more reason be expected that the facilities built under the auspices of the army will be of use. Naturally, the greater part of the construction work done by the army has been in France, although the port development work, especially in connection with warehouses at the ports has been considerable on this side of the waters. The quartermaster of the army took over the Bush terminal in New York and is proceeding to make extensive additions to it. Other warehouse facilities at the port of New York are also being constructed by the quartermaster.

General Goethals, as the officer in charge of army storage and transportation, has obtained $100,000,000 from congress, with a contract authorization for $50,000,000 more. Now it is planned by the army quartermaster to extend this work still further and congress will provide him with funds to carry out the additional establishment of both interior and port warehousing facilities.

Great Docks Built in France

The port development accomplished by the army engineers in France is said to be a wonderful achievement. France, early in the war, very naturally took over such of her own ports as were most readily available for war imports. The English then took over all of the channel ports. When the United States came into the war three years later, all of the available French ports were being utilized to their maximum capacity for war purposes. To interfere with those ports and turn any portion of them over to the Americans would very naturally have interfered with the progress of the war. As a consequence the United States has gone into new areas, built four ports in France, dredged the approaches, built piers and constructed miles of warehouses. According to those who have been privileged to view the work done, it has been declared a wonderful accomplishment on the part of our army engineers.

What has been done in a temporary way on the other side to meet an emergency is being done systematically and scientifically on this side. The developments are along the Atlantic coast because it is this coast which is nearest to the war. The port developments here are for permanence and therefore for the future. New York, naturally, has been the pivotal point. So vast have been the port undertakings at that locality that a port commission was appointed, with representation from the army, the navy and the shipping board. This supplemented the work of the famous by-state port committee, and other organizations interested in the development of the harbor of New York.

Enemies Lose Their Piers

At the instance of the executive, congress amended the trading-with-the-enemy act, so as to give authority to the President to assume possession of the German piers and other dock facilities owned by enemies in New York. With one stroke of the pen the United States government came into possession of dock facilities which are of greatest value at the present moment. The government is making improvements to these and they will constitute the permanent investment of Americans in the future of the American merchant marine.

Early in the development of the port of New York, the railroad administration began to fear that an over-development of that port would cause freight congestion there. Temporarily the army's plans to build large warehouses there were held up. After a careful survey of the situation the developments were allowed to proceed. It was discovered that by using the newly completed New York state barge canal and other inland waterways in conjunction with the railroads, freight congestion would disappear. But while the yast additions are being made to the port of New York, not all the increases incident to the war are to be placed there. Boston will be utilized as well. Baltimore is being developed, and Norfolk, Va., is destined to become increasingly important. **Charleston, S.**

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C., is rapidly coming to the front, and with the incentive lent her by the construction work for the army and the navy, intensified by the location of more shipbuilding activities, she promises to be one of the ports of the future.

Port development has until very recently been allowed to proceed in a more or less independent way. Each branch of the government has been making developments where it thought best. Now all port activities are to be centralized in one directing agency of the government. At the instance of the United States shipping board, a commission on port facilities has been created. Congress has appropriated $25,000,000 for the use of this commission. E. F. Carry, whom Chairman Hurley made director of operations of the Emergency Fleet corporation, has been made chairman of the new commission; S. M. Felton, the director general of military railways, represents the army, he having had great experience in construction work and in the building and operation of railways; B. L. Winchell, director of traffic of the Union Pacific railroad and a man of great experience in traffic matters, represents the director general of railroads in helping to co-ordinate the southern and other ports with the railroad facilities. Captain Hogdson represents the navy. George Dearborn, of New York, who is a large ship operator, and J. H. Rossiter from the Pacific coast are also members of the commission.

EDWARD F. CARRY
Chairman of the Commission on Port Facilities

The whole subject of ports and harbors, bunkering and drydock facilities in the United States and abroad is under survey. Data is rapidly being gathered and compiled to show the number of drydocks in this country; the capacity of each drydock and its condition; whether constructed of steel, concrete or wood; whether owned by private parties or others; rates and terms for the docking of ships; exact location of each drydock, and whether it is stationary or floating; number of ships docked during the past five years; class of repairs; length of time each ship was held, etc. The same kind of information is being gathered concerning facilties for furnishing ships with coal and fuel oil, not only in this country, but on every route traveled by merchant ships all over the world.

Upon this information, which will be carefully tabulated and charted, will be determined how many drydocks are needed in our ports to take care of the rapidly growing American merchant fleet. These docks are to be of the most modern type, with ample capacity for large ships and every device for the speedy docking and repairing of vessels. These docks, it has been declared by authorities, are to be built at the earliest possible date, and placed in ports according to the number of ships to be served, so that no American merchant vessel will lose time hunting repair facilities. There will also be emergency repair equipment designed to take care of the ships that cannot reach drydocks, as in the case of wreck or damage. Floating repair outfits will be provided for this purpose, rendering aid wherever it is needed to salvage damaged ships and get them back into service.

Steps have already been taken to provide our ports with the most modern devices for loading and unloading cargo. The war early demonstrated that railroad facilities could be multiplied by promptly loading and unloading cars and keeping them constantly in service. The possibilities for multiplication of ship tonnage in this way are even greater, for a single ship has tonnage equivalent to several trainloads of cars, and modern port equipment gives a control of this factor difficult to attain on the railroads.

Bunkering and fuel oil facilities are being investigated in great ports like Liverpool, and the best experience everywhere will be drawn upon by experts. No lack of bunkering facilities will be permitted to interfere with our mercantile trade either in

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this country or abroad. When necessary foreign port facilities will be improved, and new coaling and fuel oil stations provided.

These developments are vital now in the midst of war, for out of every 100 tons of shipping on the ocean today, 15 tons are sufficient to transport troops and the remaining 85 tons are needed to supply food, munitions, clothing and equipment for our armies. This 85 per cent of tonnage needed to maintain our soldiers must ply not merely between the United States and France, but be kept at work bringing up materials from every part of the world. Modern coaling and repair facilities mean, today, multiplication of ship tonnage to win the war, and tomorrow they will mean the highest possible efficiency in our mercantile fleet for promoting the ends of peaceful America all over the globe.

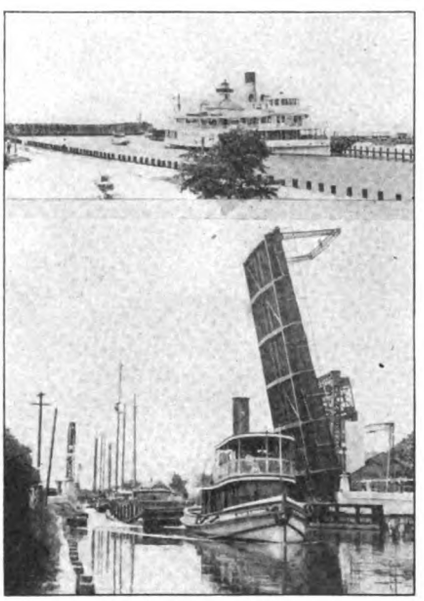
On the American coast today there are only 27 drydocks. On the Great Lakes alone, where the demand for water-borne transportation has contributed to the development of shipping to the extent of 2,300,000 tons, there were in 1915 20 drydocks of 250 feet or more in length. On the basis of this proportion it has been declared that the United States will require 182 docks for our future mercantile fleet. The activities of German submarines along our coast has brought the dock question to the front. Scarcity of drydocks on the Atlantic seaboard at the present time threatens to render abortive any attempt to repair vessels torpedoed. New York, of course, has nine dry docks of more than 350 feet in length, while the facilities at Philadelphia and other Atlantic ports are short. The shipping board is reputed to have in mind a suggestion to build a number of floating docks which can be carried from one Atlantic port to another as the necessity arises. This would meet the immediate emergency in a way.

Mr. Carry's commission has already made a survey of Philadelphia terminals, and is now making a survey of Boston and New York terminals. Within a short time a similar survey of southern ports will be made. The improvements recommended will be to supplement the terminal facilities of the railroads. Where the shipping board plans to build piers, docks and wharves, the railroad administration will construct rail terminals, warehouses and supplemental facilities. The developments, consequently, will be made with an eye to the future. The railroad administration plans also to make use of inland waterways and will build terminals with these in view.

Canal Helps to Feed City

The accompanying illustrations show how the New Basin canal helps to provide New Orleans with food and other supplies. Since the United States entered the war, many small steamers once used only on inland waters, have been taken over by the government for use in coastal service as tugs and short-distance freight carriers. Thus the waterways of Louisiana have been forced to depend on power boats and even small sailing vessels to get farm and dairy products to New Orleans.

Through the rivers, bayous and streams, the vessels come into Lake Pontchartrain and then are towed by steam tugs up the New Basin canal into the heart of the city, where their



NEW BASIN CANAL AT NEW ORLEANS

cargoes can be unloaded anywhere along the route.

The lower illustration shows a tug towing a barge and five schooners through the open draw of one of the steel bascule bridges over the canal. The upper illustration shows the mouth of the canal where it enters Lake Pontchartrain. This canal is the most important of New Orleans' several waterways.

Breaks Punching Record

Riveting records are being set by steel shipyards but before plates can be riveted they must be punched. The record for holes punched one at a time in 10 hours has been broken, it is said, at the plant of the Ferguson Steel & Iron Co., Buffalo. The company is fabricating and assembling 16 steel barges for the United States railroad administration. The operator, A. Rostowicy, punched 18,624 holes in 10 hours, most of the holes being about 4 inches apart. This breaks the record held by Charles Milburn, Chicago, who several years ago, punched 18,310 holes in 10 hours. By breaking the record, Rostowicy has achieved something many men have tried for during the past year and a half, since the United States has gone into the shipping game in earnest. His record means that he punched 31 holes a minute, or at the rate of more than one hole every two seconds throughout the 10 hours.

Naval Architects to Meet

The Society of Naval Architects and Marine Engineers will hold its twenty-sixth general meeting in Witherspoon hall, Walnut and Sansom streets, Philadelphia, on Thursday and Friday, Nov. 14 and 15. There will be a banquet at the Bellevue Stratford hotel Friday, Nov. 15 to which all members and their guests are invited. The tickets are $4 each.

The council will meet at 3 p. m Wednesday, Nov. 13, in the office of Daniel Cox, secretary and treasurer of the society, United States shipping board building. It is pointed out that Philadelphia was chosen as the place for the meeting as it is in the center of the Atlantic coast shipbuilding industry.

Many interesting papers on timely subjects have been prepared as the following list indicates:

Revival of Wooden Shipbuilding as a War Emergency—By Carlos deZafro.

Floating Dry Docks—By Charles N. Crowell.

On Vibrations of Beams of Variable Cross Section—By N. W. Akimoff, Visitor.

Notes on Progress in Turbine Ship Propulsion—By Francis Hodgkinson, Visitor.

Structural Steel Standardized Cargo Vessels—By Henry R. Sutphen, Member.

Notes on Launching—By William Gatewood, Member.

Side Launching—By Frank E. Kirby and Edward Hopkins.

Experiments upon Simplified Forms—By Professor H. C. Sadler.

Standardization of Ships—By A. J. C. Robertson.

Variation of Shaft Horsepower, Propeller Revolutions and Propulsive Coefficient with Longitudinal Position of the Parallel Middle Body in a Single Screw Cargo Ship—By Naval Constructor William McEntee, U. S. N.

Recent Developments in Shipyards Plants—By Naval Constructor Sidney M. Henry, U. S. N.

Concrete Ships—By R. J. Wig.

The Application of Electric Welding to Ship Construction—By H. Jasper Cox.

Hog Island—The Greatest Shipyard in the World—By W. H. Blood, Jr.

The steamer SCRANTON, loaded with grain for Goderich, Ont., went ashore north of Southampton, Lake Huron, Saturday, Aug. 24. After being released she went to Port Huron, Mich., where she will receive 20 new plates.

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Solving New York's Port Problems

Tapping Railroad Trunk Lines Outside Congested District and Transferring Cargoes to Barges is Plan Urged by Engineer

By Benjamin A. Howes

THE measure I propose to relieve the freight congestion in the port of New York is to tap the railroad trunk lines at convenient points outside the district of terminal congestion and transfer to barges and perhaps car floats such kinds and amounts of freight as is necessary to release the present terminals and yards for their most effective usefulness. Such freight would be classified on the barges and, if for city use, delivered at small piers convenient to destination from which it could be trucked direct as is the case with building materials now or delivered to ships.

Such a program would call for a large number of barges, floats, unloading equipment, tow boats and proper transfer yards and docks of temporary and emergency construction, all of which could be built for less cost and more quickly than railroad cars and locomotives which they would release and without diverting needed material and skilled labor from military requirements.

Harbor Facilities

No description of the present condition of traffic or facilities in the port of New York is needed here. A good description of port organization, equipment and operation is given in the New York harbor case and while not primarily so intended it shows clearly the present extraordinary disorganization and how it came about. The report of the commission to investigate the surface railroad situation on the west side in the city of New York also gives a complete review of the New York harbor situation and outlines a plan for the comprehensive improvement of the port. This improvement, however, could not possibly be executed fast enough to help in the present emergency.

The emergency measure I propose could never before have been applied. The country never before realized that the port of New York and its freight facilities is a great national question. The result is that its development has been left to the conflicting interests of the great trunk lines, the several municipalities and the two or three states concerned, without any co-ordinating authority and apparently without the various interests and authorities realizing the vital necessity for subordination of the component parts and organization of the whole.

In the light of past events we can see the principal reason the national government had to take over operation of the railroads was because the conflicting interests had been unable to get together and organize the port of New York for the mutual benefit of all concerned and with special regard for the interests of the country at large. The vital interest of the whole country in the port of New York is now intelligently aroused. A port board can be appointed and given full authority by the federal government to develop the port on a comprehensive plan for its great future growth. A vast amount of most valuable preliminary work has been done by various commissions, individuals, associations and corporations, but to get any considerable measure of relief along the lines of permanent development of the port would take several years of planning, condemnation and construction before results could be operative.

The urgent need is for emergency measures that can be made helpful at once and fully effective within a year without too much waste or excessive cost. I have carefully considered the lines along which the permanent development of the port of New York should proceed as a national development and none of the emergency measures I propose will in any way hamper such development, but will assist it. The following data gives some idea of the size and complexity of the problem, the data being based on conditions several years ago, tonnage now being vastly greater: Shore and pier line of port of New York, 921 miles; annual tonnage floated, 114,000,000 tons; coal for local use, 16,000,000 tons; coal passing through to New England, 10,000,000 tons; coal for bunkers, 5,000,000 tons; tonnage of vessels entering and clearing, 30,000,000; wheat arriving, 3,000,000 tons; other tonnage passing into and through New York harbor, exceeding 40,000,000 tons.

Relieving Congestion

Any congestion that slows down the orderly movement of this enormous volume is, of course, cumulative, so emergency measures would look to keeping the flow moving and to diverting tonnage from congested points.

As to demurrage rates and free time, these remedies have now been applied about to the limit and are not to any large extent constructive helps. I understand that the plan of pooling terminals is being applied as rapidly as it can be worked out and will be of considerable help. "Store-door delivery" of goods is now having careful consideration and its great promise in expedition and economy will undoubtedly result in its

An Emergency Measure

NOW to avoid a repetition of last winter's paralysis of terminal and shipping facilities at New York is a problem claiming the attention of some of the country's foremost engineers since the federal government recognized the importance of the question in connection with its war plans. The accompanying article is from the report of Benjamin A. Howes, New York, submitted to James S. Harlan, chairman of the committee on congestion at the port of New York of the interstate commerce commission. The report is based on a preliminary survey made for the committee. Its most important feature is the proposal to tap railroad trunk lines at convenient points outside of the congested metropolitan districts transferring the freight to barges. It is understood that the remedy proposed is an emergency measure and Mr. Howes summarizes his conclusions with this statement: "This program with modifications and extensions as experience indicates from time to time will in the most economical manner possible meet the emergency until a properly authorized port board can plan, organize and execute a comprehensive permanent port development."

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adoption. It will greatly relieve congestion at terminal piers and help local shippers and consumers.

It is evident some commodities can be handled at much more rapid rate with the same amount of equipment at some seasons than at others and operating measures should be taken so far as possible to take advantage of seasonal shipments and proper storage. This is now largely done and is being given increased consideration.

I wish particularly to speak of pooling of floatage equipment, diversion by floatage around congested areas and the need of additional floatage and emergency transfer points and then to suggest a program that can be m de to meet the equipment emergency until permanent port development can be had. The program will also go far toward releasing rolling stock and solving the railroad problem. I will, therefore, first discuss the probable present and future needs and then the constructive program.

A Huge Terminal

New York harbor has been variously described as a great communication switchboard and as a great internal belt line railroad where the equipment was not confined to rails in its movement. For the purpose of this emergency solution I prefer to picture its functions as a great combined terminal and classification yard where every unit can move independently of all others and of rails and switches, so that the classifications, receipt and delivery of goods can take place at any point as convenience or emergency dictates.

The port problem is now similar to the store-door delivery problem in Manhattan, but on a vastly larger scale of units and tonnage. The floatage needs today are probably 100 per cent greater than three years ago with probably not more than 30 per cent greater efficiency due to speeding up and new building counterbalanced by losses, commandeering and lack of labor.

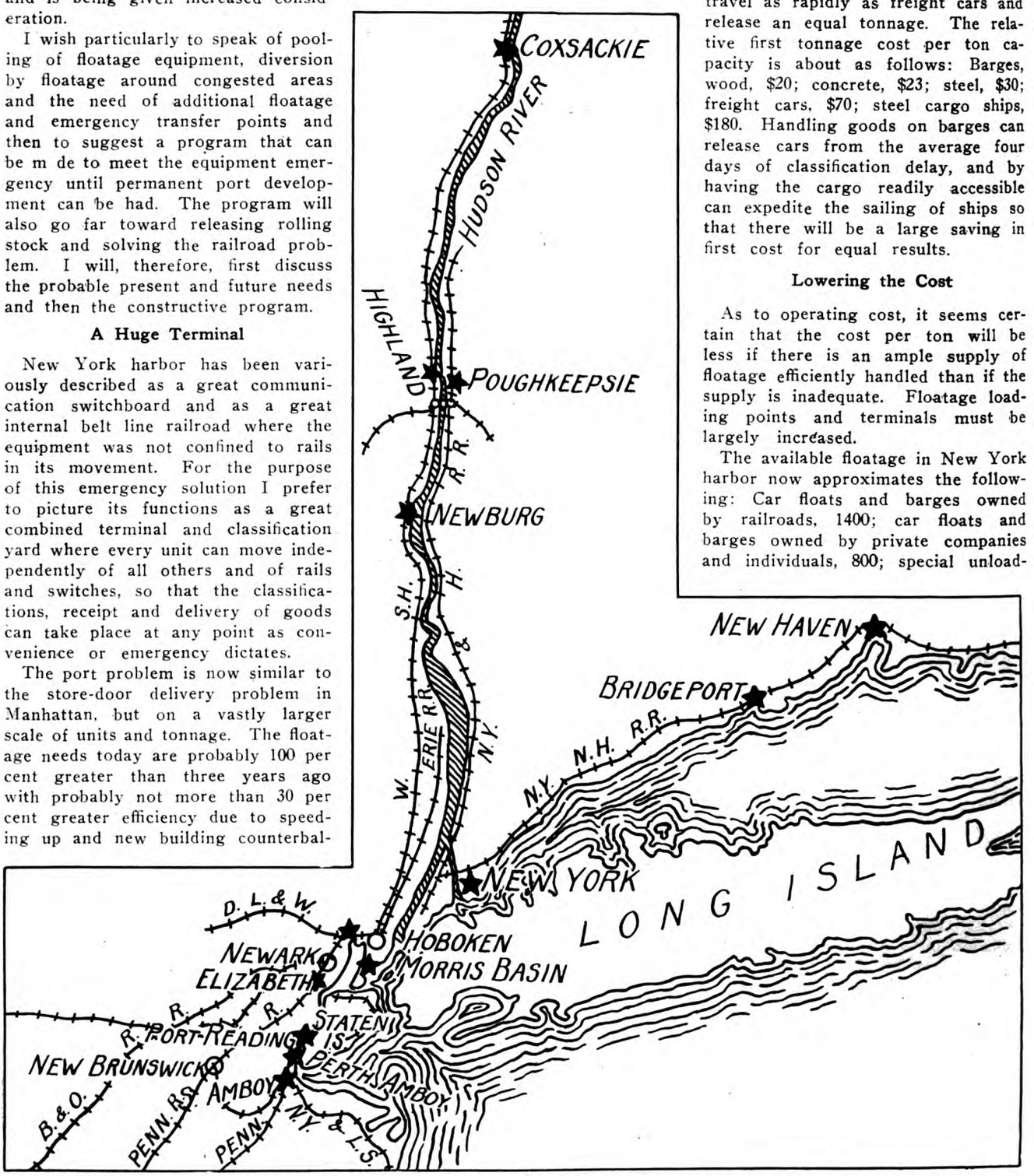
If we consider our army and navy tonnage program for the next 18 months, the economic location of New York with regard to foreign shipment and interior rail lines, the war contracts resulting in enormous production within 100 miles of New York, and the absolute requirements of the present and incoming civil population in this manufacturing district, I think there will be no need of statistics to help us to agree that the floatage needs within a year will be double what they are now.

The port is now deficient in warehouses, rolling stock, terminals and ocean shipping, and all of these are impossible of amplification without serious diversion from vital war needs, direct or indirect. Goods on barges travel as rapidly as freight cars and release an equal tonnage. The relative first tonnage cost per ton capacity is about as follows: Barges, wood, $20; concrete, $23; steel, $30; freight cars, $70; steel cargo ships, $180. Handling goods on barges can release cars from the average four days of classification delay, and by having the cargo readily accessible can expedite the sailing of ships so that there will be a large saving in first cost for equal results.

Lowering the Cost

As to operating cost, it seems certain that the cost per ton will be less if there is an ample supply of floatage efficiently handled than if the supply is inadequate. Floatage loading points and terminals must be largely increased.

The available floatage in New York harbor now approximates the following: Car floats and barges owned by railroads, 1400; car floats and barges owned by private companies and individuals, 800; special unload-



MAP OF THE PORT OF NEW YORK, SHOWING THE EMERGENCY FREIGHT INTERCHANGE BETWEEN RAILROADS AND BARGES PROPOSED BY BENJAMIN A. HOWES IN HIS REPORT TO A COMMITTEE REPRESENTING THE INTERSTATE COMMERCE COMMISSION

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ing units, etc., 450; tow boats and steam scows, 650. It has been evident in the past four months that some of this equipment has lain idle while other similar equipment was utterly inadequate to its task. Such waste is inevitable when the various units of ownership are operated competitively as now. The conditions are so similar to the truckage delivery and congestion in Manhattan that it seems evident that if all floatage in the port were pooled under efficient and arbitrary authority the following would result: Diversion of floatage from congested delivery points to other delivery points; concentration of floatage to congested receiving points; reduction of cross hauls; less dead mileage; less waiting; more full loading; more rapid loading; operating labor more efficient and reduction of cost.

I believe that very soon the same floatage would be able to handle 50 per cent increase of tonnage. The results would be the average saving of one day's detention each day of 3000 cars now tied up and 10,000 tons of ocean shipping now tied up waiting for mixed cargo, a large amount of freight which is delayed and vitally needed by general business.

Additional Floatage

The next emergency need is to provide for additional floatage and its necessary terminal facilities. Pooling and intensive operation of the floatage, in addition to the fact that it would be economical to use a large amount for the holding of freight which is now held in cars, would probably allow 50 per cent of the floatage to be loaded at the present points of transfer both incoming and outgoing. For the discharge of cargo from this floatage two simple methods in wide use would suffice if aided by a judicious arrangement of standard floating unloading equipment. Ship-side delivery would be made direct to ship either at piers or at the side of the ship at anchorage in the "stream". Local deliveries would be roughly classified on the barges and delivered to small local piers or emergency floats from which "store-door delivery" could be made with minimum truck haul, as is the case with heavy freight on the Seine at Paris and at the manufacturing cities on the Rhine. This service should be extended as necessary along Long Island sound to relieve the New Haven railroad and Long Island railroad terminal congestion and up the Hudson river. This service could be augmented, as in the case of coal, by requiring private and public power plants having reserve coal-unloading capacity to unload the coal required in their adjacent territory which would ordinarily come by rail or less direct route thereby saving rolling stock or labor for more pressing needs.

There will be needed yards for transferring freight from cars to barges or the possible transferring of cars to floats. The preference today in the port is to transfer cars to floats, and while there may be economy in this in ordinary times in this emergency, when every car is vitally needed, it would seem wise to reduce the floating of cars as much as possible. New transfer points will be needed for three reasons: Present transfer points cannot handle the volume of business that is due to come within two years; if the freight spends the time on barges that it would ordinarily spend in cars in classification and delivery yards there will be a helpful release of cars and in case of congestion in classification yards and terminals or a great disaster it would be vitally necessary to have ready means of diversion for important freight.

Therefore, there will be need to tap the main rail lines back of the congested areas as far as possible and to divert freight to the barges. Such freight could be reported from the diversion point and delivery dated. It will arrive at destination as quickly as if it proceeded as it does now and the cost should be no greater.

Since the railroads have always done all in their power to prevent such interchange of freight, a careful survey of tonnage requirements, classes of freight, depth of water and local advantages and disadvantages must precede the final decision as to these emergency transfer points, but I have selected the following as being possible: West Shore railroad, above Poughkeepsie, at Coxsackie and at Haverstraw; New York Central railroad, above Poughkeepsie; New York, New Haven & Hudson River railroad, Mott Haven, Bridgeport and New Haven; Pennsylvania railroad, Morris basin and South Amboy; Delaware, Lackawanna & Eastern railroad, Newark; Erie railroad, Newburg and Newark; Central Railroad of New Jersey, Elizabethport; Reading railroad, Elizabethport and Port Reading; Baltimore & Ohio railroad, Elizabethport and Staten Island; Lehigh Valley railroad, Perth Amboy; Long Island railroad, connection to be made at various points in Long Island City or Brooklyn, with large amount of freight, normally moving in cars, to be delivered by barge to such north shore points as Oyster Bay, Huntington, Port Jefferson, etc., releasing rolling stock and motive power for other service.

New floatage is now urgently required and it seems probable that within two years 1,000,000 tons will be needed for the port and Long Island sound, and 500,000 tons for the barge canal, but pending a more definite tonnage survey it seems certain there is urgent need to start immediately on the following program:

1000 barges of 500-ton capacity..	$10,000,000
200 tow boats.....	10,000,000
New transfer points.....	7,500,000
100 floats with special equipment for unloading	4,500,000
Total	$32,000,000
This equipment would release for active service:	
10,000 freight cars.....	$21,000,000
50 locomotives	2,000,000
20 ships	18,000,000
	$41,000,000

The barges, tow boats and other emergency equipment would probably be built mainly of wood. I am advised by the war department that they will furnish lumber for barges at government prices and that there is practically unlimited supply. If the program should develop a scarcity of lumber or skilled labor the barges and floats may be built of reinforced concrete without interfering with the labor or materials needed in the shipbuilding program.

Late Marine Patents

Copies of any one of these patents can be obtained by sending 15 cents in stamps to Siggers & Siggers, patent lawyers, National Union Insurance building, Washington, by mentioning THE MARINE REVIEW.

1,235,681, Sternway steering mechanism for ships, Chas. O. Griswold, Portland, Oreg.

1,235,725, Internal combustion engine, Wm. M. Power, Port Chester, N. Y.

1,235,780, Submarine vessel, Alphonse Fernandez, Washington.

1,235,781, Detachable armored section for submarines, Alphonse Fernandez, Washington.

1,235,782, Torpedo launching apparatus, Alphonse Fernandez, Washington.

1,235,783, Mine destroying device, Alphonse Fernandez, Washington.

1,235,937, Marine turbine propulsion, James C. Shaw, Philadelphia, assignor to the Wm. Cramp & Sons Ship & Engine Building Co.

1,235,991, Marine propulsion, John F. Metten, Philadelphia, assignor to Wm. Cramp & Sons Ship & Engine Building Co.

1,236,191, Propelling mechanism for vessels, Elijah R. McCreary, Franklinton, La.

1,236,310, Automatic life preserver, Willis F. Johnson, Riverside, Cal.

1,236,539, Means for locating and securing sunken vessels to hoisting apparatus, Thos. J. Cahill, San Francisco.

1,236,750, Ship, Seraphim Ouimet, Montreal, Que.

1,236,956, Device for hoisting safes from sunken vessels, Henry Lotz, Providence, R. I., assignor to the Lotz Protector & Salvage Co., Providence.

1,237,085, Boat raising and lowering mechanism, Woodbury T. Oliver, Newport News, Va.

1,218,422—Navigator's alidade. Adolph Lietz, San Francisco.

1,218,525—Ship's draft gage. Joseph M. Cole, New York.

1,218,546—Submarine torpedo. Walter R. Gillis, Superior, Wis.

1,218,586—Destruction of submarines. Joseph A. Steinmetz, Philadelphia.

1,218,027—Propelling mechanism. William F. Wilke, La Fayette, Ind.

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West Coast Leads in Wooden Ships

Ships—and More Ships—Speeding From 48 Yards in Oregon and Washington in Epochal Burst of Patriotic Industry

By A. Mobley Sutton

LOOK into the shipyards of the great northwest if you are inclined to be pessimistic concerning the government's progress with the shipbuilding program. There is no better antidote to doubt and questioning than a trip to these yards, now teeming with life, and fired with the determination to win victory by working hard for it.

Progress in the last year in those wooden ship districts of the northwest, where construction of ocean-going steamships was practically unknown before the war, strikes one more forcibly than the advance made in centers where shipbuilding was a recognized industry. Statistics mean more to one after seeing from two to eight ships nearing completion in each yard, with many already launched, and remembering that the grounds where the yards are now located were marshes when this country declared war.

In Seattle on Salmon bay, where in May, 1917, there was but a sandy marsh fringed with a few waterfront shacks, there is now a big shipyard in full operation, while in Portland at the yards of the Grant Smith-Porter Co., on the Willamette river, a similar marsh was filled within eight months, buildings were erected, machinery installed, and in May eight ships were on the ways and 10 ships were tied up at the installation docks.

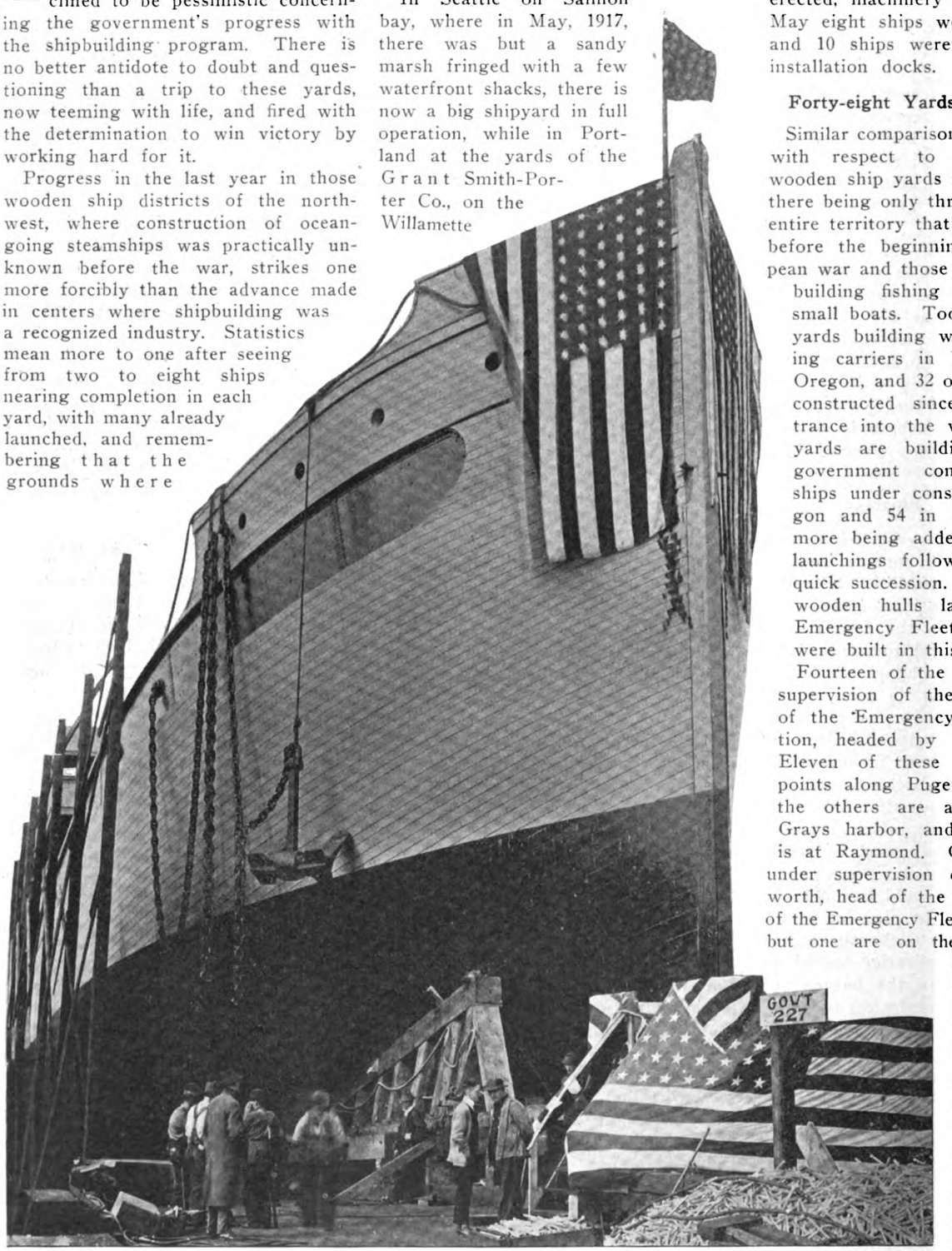

FIG. 1—CHEER FOR THE SHIPS OF THE NORTHWEST! LAUNCHING OF THE UNITED STATES EMERGENCY FLEET STEAMER WALLOWA AT PORTLAND

Forty-eight Yards In Operation

Similar comparisons might be made with respect to nearly all the wooden ship yards in the northwest, there being only three or four in the entire territory that were established before the beginning of the European war and those were engaged in building fishing craft and other small boats. Today there are 48 yards building wooden ocean-going carriers in Washington and Oregon, and 32 of the yards were constructed since America's entrance into the war. Twenty-six yards are building ships under government contract, with 65 ships under construction in Oregon and 54 in Washington and more being added every day, as launchings follow each other in quick succession. Of the first 57 wooden hulls launched for the Emergency Fleet corporation 41 were built in this territory.

Fourteen of the yards are under supervision of the Seattle branch of the Emergency Fleet corporation, headed by William Pigott. Eleven of these are at various points along Puget sound, two of the others are at Aberdeen, in Grays harbor, and the fourteenth is at Raymond. Of the 12 yards under supervision of L. J. Wentworth, head of the Portland branch of the Emergency Fleet corporation, all but one are on the Columbia river or its tributary, the Willamette, the one being at Tillamook, a few miles down the coast from the mouth of the Columbia. The names of the yards and their location are: Direction of the Seattle office—Allen Shipbuilding Co., Meach-

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FIG. 2—SPLASH OF SHIPS PATRIOTIC PAEAN OF OREGON. UPPER AND LOWER, LAUNCHING OF THE UNITED STATES EMERGENCY FLEET STEAMER CALALA AT PORTLAND. CENTER, MERCHANT SHIP MOUNT HOOD ON TRIAL TRIP

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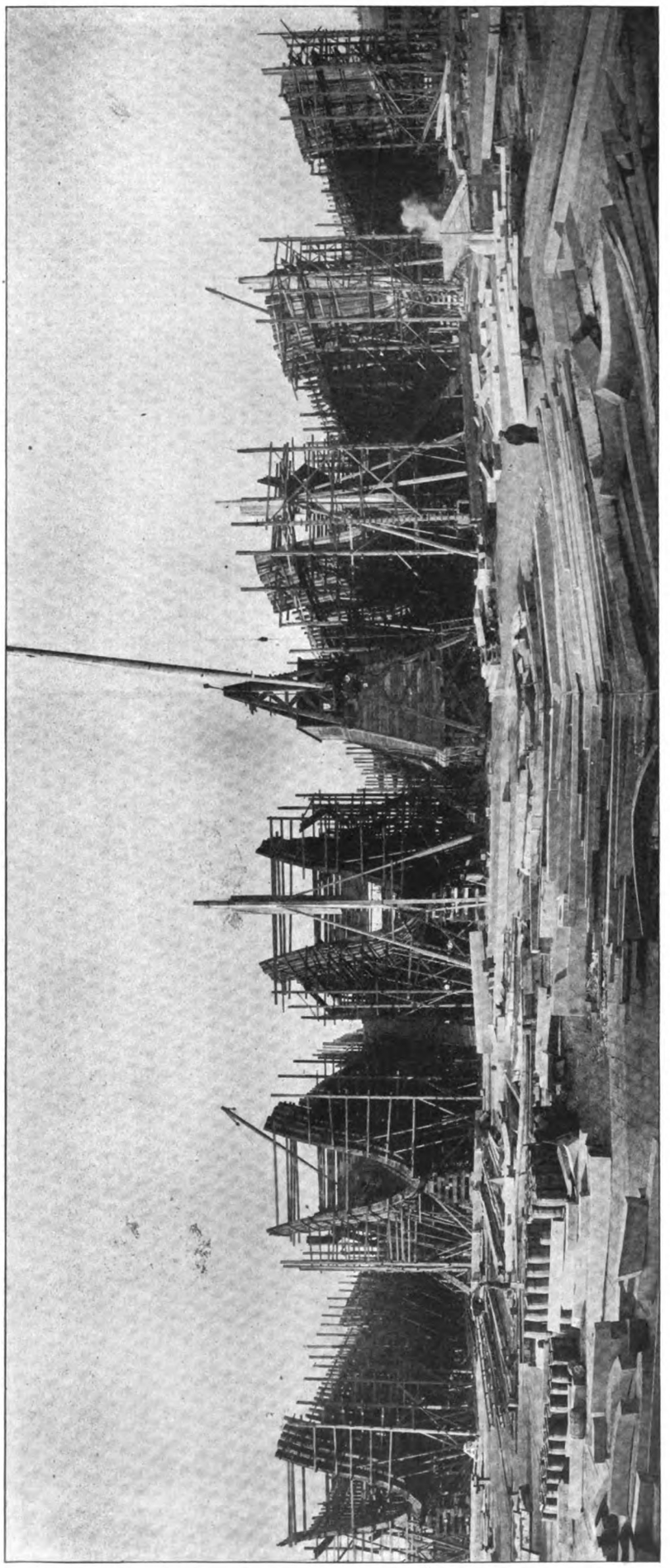

FIG. 3—NORTHWEST ANSWERING THE CRY FOR SHIPS. FRAMEWORK FOR SIX WOODEN CRAFT ON THE WAYS AT SEATTLE

am & Babcock Shipbuilding Co., Nilson & Kelez, Puget Sound Bridge & Dredging Co., all at Seattle; Seaborn Shipyard Co., Tacoma Shipbuilding Co., Wright Shipyards, Barbare Bros., all of Tacoma, Wash.; Sloan Shipyards Corp., Olympia, Wash; Grant Smith-Porter Ship Co. and Grays Harbor Motorship Corp., both of Aberdeen, Wash.; Anacortes Shipbuilding Co., Anacortes, Wash.; Sanderson-Porter Shipbuilding Co., Raymond, Wash., and the Pacific-American Fisheries, Bellingham, Wash.

Direction Portland office — Coast Shipbuilding Co., Grant Smith-Porter Ship Co., Peninsular Shipbuilding Co., Supple-Ballin Shipbuilding Co., all of Portland, Oreg.; G. M. Standifer Construction Co., North Portland, Oreg.; G. M. Standifer Construction Co., Vancouver, Wash.; Sommarstrom Shipbuilding Co., Columbia City, Oreg.; St. Helens Shipbuilding Co., St. Helens, Oreg.; George F. Rodgers & Co., McEachern Ship Co., Wilson Shipbuilding Co., all of Astoria, Oreg.; and Feeny & Bremer, Tillamook, Oreg.

To Increase Capacity

Most of the yards now have either four or six ways, some only two, while the Grant Smith-Porter company, Portland, has eight. The majority of the ships built in the northwest have been of the Ferris type, although the Hough type is a close second. In future, however, these yards will devote their time to the Ballin and the Daugherty types. The Ballin type was designed by Fred A. Ballin, of the Supple-Ballin company, Portland. It provides steel topside construction, and the ship is reinforced with steel, thus decreasing the size of the timbers used and increasing the carrying capacity of the vessel by several hundred tons. Construction of this type was fully described in the September, 1917, issue of THE MARINE REVIEW. In the new vessels to be built after this design the capacity is to be increased from 4500 to 5000 tons, the boats having a length of 323 feet over all. The greater number of the yards are building hulls only, but contracts for most of the larger yards call for the installation of machinery.

The keel for the DELANA, launched May 10 from the Supple-Ballin yards, Portland, Oreg., was laid Jan. 14. At the Meacham & Babcock yards, Seattle, where workmen began filling in the marsh June 6, 1917, the first ship, the BOULTON, was launched May 18, twelve days before the time set for her completion. A contract was given to the Nilson & Kelez Co., Aug. 31, after which the plant had to be constructed. The

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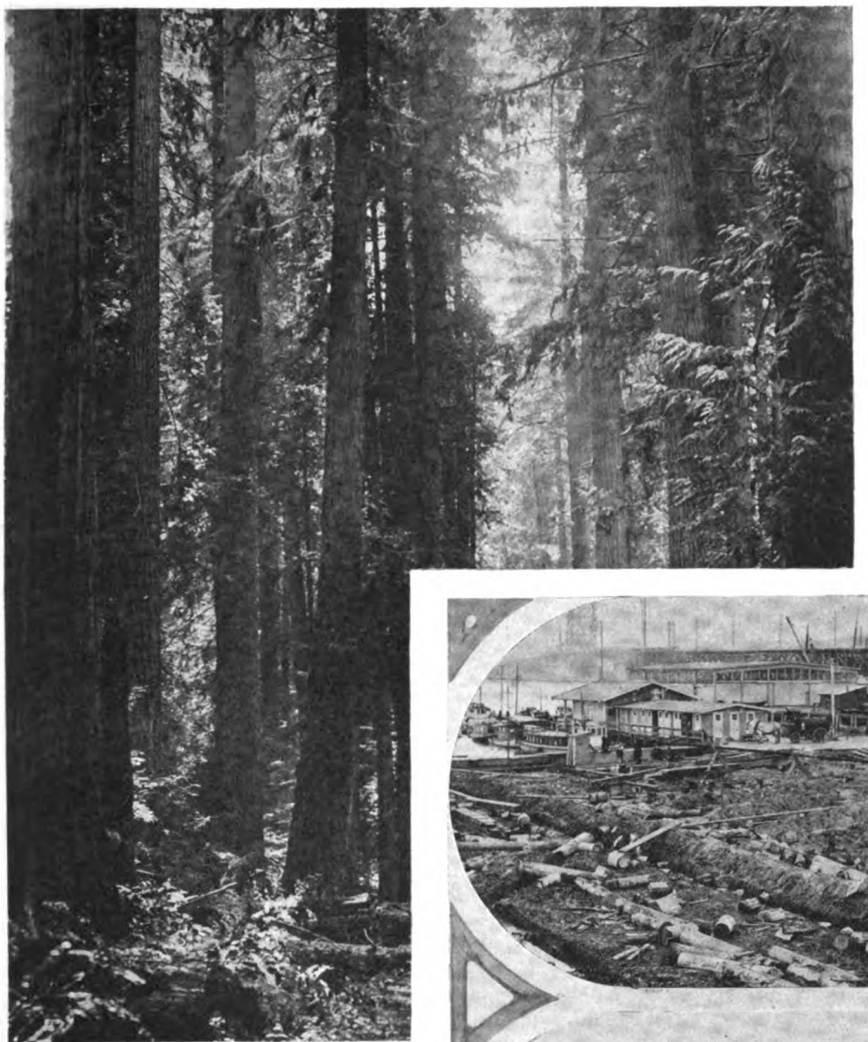

first keel was laid Nov. 15. Three ships are nearing completion in this yard.

The prize for wooden-ship construction goes to the Grant Smith-Porter Co., Portland. This company broke the world's record when it launched CAPONKA in 49 days from the time of laying the keel. Twelve boats, all of the 3600-ton Hough type, have slid into the Willamette from this yard in the last 12 weeks, and the company intends to keep up this record. Work on installation docks was begun the second week in April and was finished the first week in May. In that time 500 men, mostly unskilled mechanics, were trained. The yard is ready to equip a ship in 30 days without working overtime. Work is in progress on four ships at a time, so it is said this will bring the company's installing record up to its launching record—a ship a week. Eric V. Hauser, president, has shown his faith in his organization by wagering $10,000 that the company can build ships faster than any other company.

The president of the G. M. Standifer Construction Co. was not to be outdone by Mr. Hauser, either in building ships or in betting, for he placed $10,000 with the Portland office of the Emergency Fleet corporation, declaring his yards could build ships the fastest. The two wooden-ship yards of this company began work on government contracts later than the Grant Smith-Porter Co., but there are now 10 twin-screw Ferris type hulls on the ways and the work is progressing rapidly.

Probably the most important reason for records made by these yards is their location on the edge of the greatest forests of structural timber in America, the Douglas fir forests of Washington and Oregon. One quarter of all the standing timber in the United States is fir and nearly all of that is west of the Cascades in Washington and Oregon. The difficulty at first in obtaining a sufficient sup-

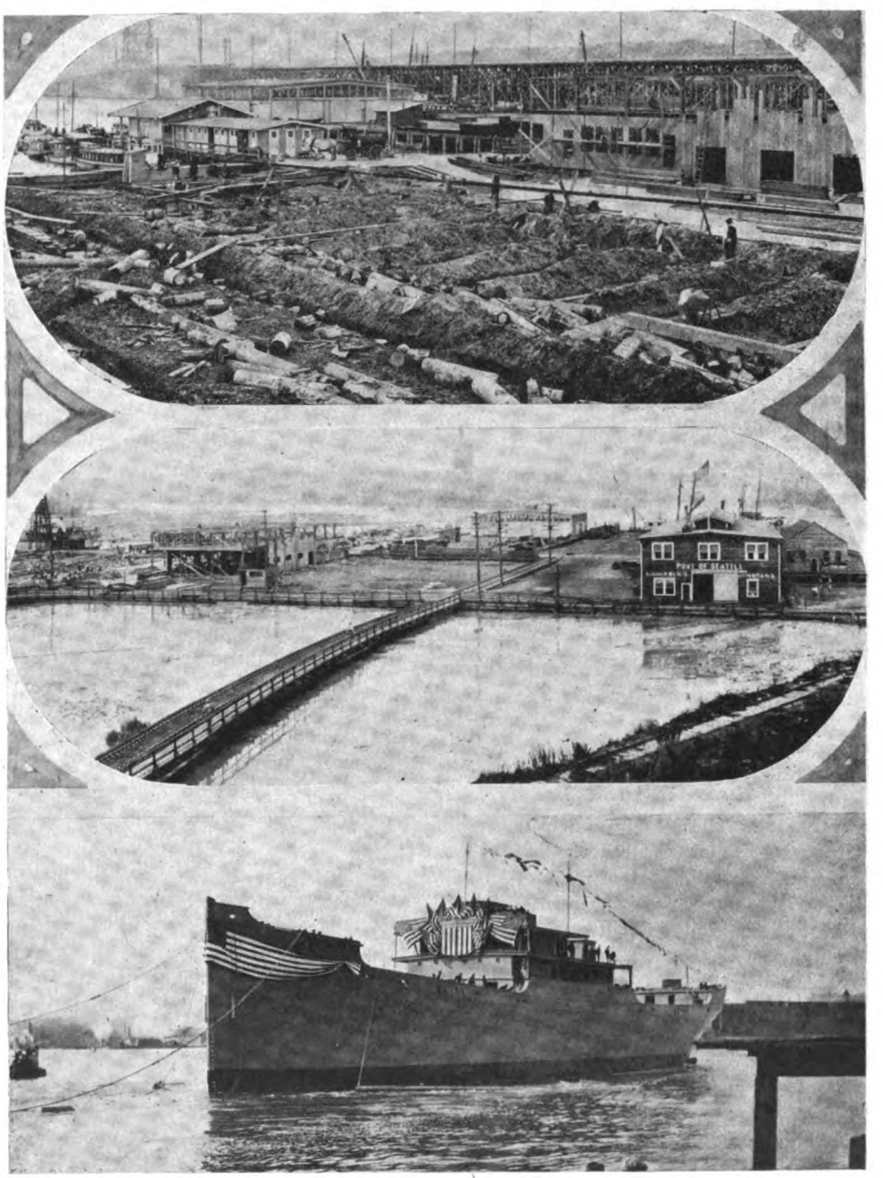

FIG. 4—FROM FOREST TO FOAM. TYPICAL GROWTH OF DOUGLAS FIR FROM WHICH THE WOODEN SHIPS OF THE NORTHWEST ARE BUILT; MEACHAM & BABCOCK SHIPYARDS AT SEATTLE A MONTH AFTER CONSTRUCTION BEGAN; LAUNCHING OF THE BOULTON, THE FIRST SHIP

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ply is explained by the sudden, unprecedented demand. The usual demand for smaller lumber than is used in the construction of ships caused the mills to cut into smaller pieces what big timber they had, and even for normal demand it takes the mills some time to stock up on big timber, because the logging companies must cut all sizes and the mills must buy both. The government had placed large orders for supplies for eastern yards, and these coming just before the majority of the shipyards of the northwest had placed orders, made it impossible for the mills to obtain big logs in sufficient quantities to supply both demands. Now, however, lumber is coming through without delay and the supply may be considered ample for years, because 20 per cent of the highland timber of the northwest is large enough for ship timbers.

The greatest difficulty experienced by shipbuilders of the northwest has been the shortage of skilled labor. When the yards started operating there was scarcely enough men to supply one as the head for each department in each yard. Most of these men were from the shipyards of Scotland or the Scandinavian peninsula who had followed the trade all their lives, but they had to train a motley crew of men, many of whom had never seen a boat out of water and some of whom had never seen one in water. At first the shipbuilders accepted all the men who came and gradually efficient organizations were developed by having skilled men teach and oversee the work of the recruits.

Machinery Invented

Efficiency also was gained by the use of machines which were invented when need for them became pressing. Included among these is the electric dubber described in THE MARINE REVIEW, July, 1918, and a planing, beveling and edging machine, described in the July, 1917, issue. Another tool invented in the northwest is a calking machine which is designed to calk at the rate of 30 feet a minute.

At the start of this wooden shipbuilding activity in the northwest there probably was no branch of the industry in which there was a greater shortage of skilled labor than in the calking department. Even now in the Seattle district there are only about 175; while there are need for more than 600. The situation in Oregon has been relieved. The calkers' union in Oregon at first consisted of 37 men. Within six months there was need for more than 400 men. After some delay and discussion, during which a plan to put seven experienced men on a job with only one apprentice was tried, the Grant Smith-Porter company developed a plan of training men. The company's head calker, formerly one of the leaders in the union, established a calking school at the yards and trained his own men. Other yards followed the example and there are now 1000 calkers in the Portland district.

Except for this trouble with the calkers and the general strike which tied up work for a month and a half last autumn there have been no labor troubles in the yards of the northwest, and a splendid spirit of co-operation has been shown between the shipbuilders and the workers. The latter are inspired by the spirit of national service. They have shown loyalty not only in their work but by supporting all the drives for funds for war needs. During the last drive for Liberty bonds the shipworkers in the Seattle district exceeded their quota by more than any other group in the city, and in Portland they subscribed nearly $2,000,000, the drive being finished in several of the yards before the official date set for its beginning.

Book Reviews

The Submarine in War and Peace, by Simon Lake; cloth; 297 pages, 5½ x 8½ inches; published by J. B. Lippincott Co. and furnished by THE MARINE REVIEW for $3.00.

Mr. Lake's peculiar position as an expert on under-water craft makes his work of vital interest at the present time. He has presented an authoritative work on the development, war uses and future possibilities of the submarine.

The author began to collect data for the book over 20 years ago. Thus he has followed the gradual development of the submarine step by step, a development which in many ways he took a personal part. At the present time, owing to the large amount of attention given under-water boats, and the large amount of data obtainable on their performances, the author was enabled to write a book that is timely and valuable.

Mr. Lake in his book presents in a simple interesting way, facts relating to the submarine, its mechanical principles, history of its development, its operation, difficulties encountered in combating it and its industrial possibilities.

The first chapter of the book gives a complete description of the submarine. This will be found of value as but few laymen have a comprehensive knowledge of the subject. The next subject taken up, under the heading of comedy and tragedy of the submarine, details the experiences which inventors met during the early development of craft for under-water navigation.

In a vivid manner the author relates the experiences of pioneer inventors of the submarine from Debrell in 1625 to the present time. In speaking of Debrell's submarine the author states that although no authentic plans of this craft are in existence, descriptions which were published show that the inventor probably did succeed in submerging below the surface of the water and propelling his boat for some distance. The experiments of Day, Bushnell, Fulton, Tuck and Holland are described at length. The account of Holland's efforts and trials are especially interesting.

In describing the evolution of the submarine the author takes the reader step by step through the experiments of other days to the present time. The use of the submarine in modern warfare is vividly described as are also the possibilities of defeating this type of craft. Under this heading, the famous DEUTSCHLAND comes in for comment.

That the submarine can be made a useful craft in times of peace is consistently set forth. Mr. Lake shows how craft of this kind can be used for under-ice navigation in polar regions, how they can be useful in hydrographic work, wreck locating, cargo recovering and oyster gathering. The book closes with a discussion on the destiny of the submarine wherein the author points out that instead of following a career of murder and piracy the submarine is designed to serve humanity in general as an agent for prosperity and peace.

The Naval Constructor, by George Simpson; cloth; 880 pages, 4 x 6½ inches; published by D. Van Nostrand Co. and furnished by THE MARINE REVIEW for $5.00.

This is the fourth edition of Mr. Simpson's book which was originally published in 1904. The book was originally prepared with the object of supplying a ready reference for those engaged in the design, construction and maintenance of ships and later editions have been expanded with this purpose in mind. In the fourth edition much new material has been incorporated, among which are details of unit offsets for a great variety of vessels. There has also been added a chapter on steam heating as applied to vessels and various additions have been made to numerous ship details.

The book is divided into seven general sections as follows: Ship calculations, strength of materials, fittings and details, rigging and ropes, equipment, miscellaneous data, and tables. The subjects are presented in a thorough and comprehensive manner. A complete index facilitates reference to particular problems.

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Novel Template Shops at Hog Island

Buildings Have Been Erected Which Duplicate Aboard Ship Conditions—Designed to Facilitate Checking and Educational Work

By B. K. Price

BACK in the early days of construction at Hog island, the idea was conceived of erecting two template ship buildings to resemble as nearly as possible the boiler and engine rooms of the *A* and *B* ships, the two types to be built at the yard. It was believed that by such an installation, templates could not only be accurately made for pipe and certain other auxiliary equipment, but that there would be various checking and educational advantages to be derived. Subsequently, and without delay, the plan was adopted. Today, as a result, there is an installation nearing completion at Hog island, which is unique in the history of the shipbuilding industry.

The buildings, considering them from the standpoint of dimensions, are 38 feet high under the roof trusses, but vary in width and length, the *A* template building being 61 x 73 feet and the *B* template building, 64 x 115 feet. The floors consist of a 10-inch concrete slab poured on 12-inch cap stringers, which in turn are supported by piling. The majority of the piles were driven last winter with considerable difficulty due to the severe weather conditions.

In each of the buildings a wooden superstructure has been erected, in order that their interiors may resemble as closely as possible the boiler and engine rooms of the real ships when completed. These superstructures represent bulkheads, ship sides and decks, from the inner bottom of the ships to the bridge deck on the *A* ship and to the shelter deck on the *B* ship, including also the thrust bearing recess. All such minor details as portholes, grating, floor plates, etc., have been carefully observed.

Equipment is Complete

The installation of equipment in these buildings has been pushed as rapidly as deliveries have allowed, and the work in the *A* structure is now completed. Included in the equipment set up in the engine room is the following: Main turbine, including reduction gears and thrust bearing; main condenser, with its circulating pump and main beam air pump; auxiliary condenser, with its combined circulating and air pump; main and auxiliary sea chest; main and auxiliary feed pumps; feed-water heater; lubricating oil cooler; ballast pump; fire and bilge pump; lubricating oil pump; oil cooler pump; fresh water pump and watertight doors for access. As steel could not be secured for the heavier machinery foundations as early as desired, concrete was used instead.

The boiler room has been equipped with three marine-type water tube boilers. One of these has been installed complete, while the other two have been left in semifinished stages, with a view to affording better opportunity for instruction. The superheaters will be similiarly treated. Fuel oil manifolds, fuel oil service, and fuel oil burners have been connected up.

By the installation of equipment in these buildings, one of the original contentions of the officials is being borne out in that many interferences such as would not have been observed on paper, are becoming apparent before too late to rectify. It is stated that on the *A* ship alone several thousand dollars have been saved in time and money.

Usually, with but one or two ships to be built from the same plans, such an expedient as a safeguard and check would be impracticable; however, with 180 ships to be erected, 110 from one set of plans and the remaining 70 from another, and with machinery coming in from all parts of the country, the installation of these buildings is being found a desirable precaution.

While the structures upon completion will have practically fulfilled all checking purposes, they will remain to serve as a training school, and to facilitate the production of templates for pipe and certain other equipment. In each of the ships to be built at Hog island, it is stated that at least 80 miles of piping will be installed. Of this amount, perhaps 80 per cent will be straight runaway pipe, while the remaining 20 per cent will be of such design as to warrant, in the building of standardized ships, the use of templates. For the purpose of making these templates, an auxiliary building, adjacent to those containing the ship models, has been equipped with woodworking machinery.

Less Fitting-Up Required

By applying the use of templates, the work of fitting up on board ship, such as would be necessary under old methods, will be considerably reduced. It was thought at one time that practically no adjusting on board ship would be required. However, experience has shown that despite the fact that ships may be erected from identical plans, there will always be a creep which necessitates some work of this nature being done, particularly in the installation of the longer pipe lengths. This work, though, is expedited materially by the use of fitting pieces.

In an educational way, the buildings have already proved advantageous. Men installing the machinery have been thus enabled to go from the template buildings to the ways thoroughly familiar with the auxiliary equipment. In the future, the buildings will afford a place where the engineers and their assistants, who will afterward man the 180 ships to be erected at the Hog island yard, can receive instruction, and will unquestionably contribute materially to the nation-wide program of training men for America's rapidly growing merchant marine.

Steamers in use in service on the Gulf of Mexico are appearing for the first time in coats of camouflage paint.

To Instruct Workmen

THIS article is the fifth in a series describing the mammoth shipbuilding plant at Hog island. The other articles published in THE MARINE REVIEW *are: "Facts About the Hog Island Yard," by George J. Baldwin, March,* 1918; *"World's Greatest Shipyard at Hog Island Now Busy Building Ships to Win the War," by E. C. Kreutzberg, June,* 1918; *"Handling Materials at Hog Island," by H. Cole Estep, July,* 1918; *"Hog Island's Compressed Air System," by B. K. Price, August,* 1918; *a special section in the September,* 1918, *issue, which contained a number of special articles including an anlysis of the yard's organization, and also a pictorial history of the yard.*

Mr. Price in the accompanying article outlines the development at Hog island of a novel idea by which practical checking and educational work is done in a template shop built and equipped to reproduce actual conditions aboard ship.

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Merchant Marine Course

In order to meet the demand for trained men to supply the organization necessary for the operation of our growing merchant tonnage New York University will include in its curriculum, starting next fall, a course in the principles of merchant marine administration and operation, it has been announced by Prof. A. W. Taylor, director of the Wall street division of the school of commerce of the university. The college of the city of New York, it is understood will give a similar course. William S. Brittain, secretary of the American Steamship association, has been selected by New York University to give the course at its Wall street division. Mr. Britain's qualifications, in addition to practical experience both in his country and England, include on the academic side several college degrees. The course will be given two nights a week.

The innovation of this branch of teaching at New York institutions is regarded of great importance in shipping circles, and New York University expects its course to be as popular with students as the course in marine insurance which it inaugurated last year, for which there were 400 applicants. This course will be continued the coming session, with W. D. Winter, of the Atlanta Mutual Insurance Co., in charge.

Business in War Time

So much a part of the country is the big war that it is impossible to talk business in any other terms, the central Liberty loan committee, Cleveland, pointed out recently. The war, and the winning of the war, are woven into our very lives. In business this is particularly true. All business is war business.

Your trade this year depends directly upon the success of our armies in France. This is a restricted way to look at the great war, to be sure, but we may view the life we are living these days—which is a war life—from every angle, surely.

Members of the marine trade will certainly see to it that they are farsighted and patriotic enough to put this loan over bigger than any of the others. Good judgment dictates it and good Americanism demands it. BUY BONDS: BUY MORE BONDS. And then some.

Lake Erie Receipts

Out of a total of 9,725,331 tons shipped from upper lake ports in August, Lake Erie ports received 7,744,585 tons, as shown by figures compiled by THE MARINE REVIEW. The balance on dock Sept. 1 was 8,152,214 tons as against 6,705,672 tons on Sept. 1, 1917. Detailed figures are:

Port	Gross tons
Buffalo and Port Colborne	1,577,397
Erie	303,374
Conneaut	959,717
Ashtabula	1,802,324
Fairport	271,039
Cleveland	1,584,909
Lorain	538,227
Huron	296,061
Toledo	386,621
Detroit	24,916
Total	7,744,585

Steamship Association Holds Meeting

THE American Steamship association held its annual meeting Sept. 4 at its offices, 17 Battery place, New York. E. J. Barber took the place of J. Howland Gardner as vice president and member of the executive board. All the other officers of the association were re-elected, as follows: President, H. H. Raymond; vice president, E. J. Barber; secretary and treasurer, W. S. Brittain; attorney, E. H. Duff; executive board, H. H. Raymond, chairman; H. F. Alexander, G. S. Dearborn, P. A. S. Franklin, E. J. Barber, F. D. Mooney, W. H. Pleasants, Alfred G. Smith, H. B. Walker and D. T. Warden.

Providing the Crews

After a discussion on the important question of the personnel of the merchant marine, the following resolution passed by the association:

"That it is the sense of this meeting that in order to provide crews for the large number of vessels now being built the shipping board furnish the necessary men to man these ships, or that the navy be requested to man the entire merchant fleet."

To facilitate the work of the association it was decided to divide the shipping firms of the country into sections. In future, as far as possible, sectional meeting will be held for predominately sectional affairs, thus saving a good deal of time for members not specially interested in the business coming up. The following divisions have been made:

Transoceanic Lines

American-Hawaiian Steamship Co., American Transportation Co., Barber Steamship Lines, Inc., China Mail Steamship Co., Dollar Steamship Co., Garland Steamship Corp., International Mercantile Marine Co., Luckenbach Steamship Co., Matson Navigation Co., Oceanic Steamship Co., Oriental Navigation Co., Pacific Mail Steamship Co., States Marine & Commercial Co., Strachan Shipping Co., and Pacific Steamship Co.

Coastwise, West Indian, Central and South American Lines

American-Hawaiian Steamship Co., Atlantic & Pacific Steamship Co., Barber Steamship Lines, Inc., A. H. Bull Steamship Co., Clyde Steamship Co., Colonial Navigating Co., Eastern Steamship Lines, Inc., Gulf & Southern Steamship Co., Hartford & New York Transportation Co., Mallory Steamship Co., Munson Steamship Line, New England Steamship Co., New York & Cuba Mail Steamship Co., New York & Porto Rico Steamship Co., Ocean Steamship Co. of Savannah, Old Dominion Steamship Co., Peninsular & Occidental Steamship Co., Red D Line, Seaboard & Gulf Steamship Co., Southern Steamship So., Southern Pacific Co., United Fruit Co., American Transportation Co., Globe Line, Oregon S. S. Corp., States Marine & Commercial Co., United States Steel Products Corp.

Pacific Coast Lines

Alaska Steamship Co., American-Hawaiian Steamship Co., Arrow Line, Pacific Steamship Co., Pacific Mail Steamship Co., Dollar Steamship Co., San Francisco & Portland Steamship Co., Southern Pacific Co.

Bulk Carriers, Miscellaneous

American Transportation Co., A. H. Bull Steamship Co., Freeport Sulphur, Transportation Co., Ore Steamship Corp., Seaboard & Gulf Steamship Co., Union Sulphur Co., United Fruit Co., United States Steel Products Co., States Marine & Commercial Co., Munson Steamship Line.

Bulk Carriers, Coal

Coastwise Transportation Co., Consolidation Coastwise Co., Crowell & Thurlow Steamship Co., New England Fuel & Transportation Co., Shawmut Steamship Co., C. H. Sprague & Son, Seaboard & Gulf Steamship Co.

Tankers

Associated Oil Co. of California, Atlantic Refining Co., Gulf Refining Co., Pan-American Petroleum & Transport Co., Southern Pacific Co., Standard Oil Co., N. J., Standard Oil Co., New York, Sun Co., Texas Steamship Co., Union Oil Co. of California, Vacuum Oil Co.

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American Ship Yard Activities

A Snappy Summary of the Leading Events of the Month in the Vessel Construction Field

Transform Waste Land Into Shipyard

By H. H. Dunn

INTO an Atlantic port, a few days ago, steamed the largest wooden ship ever built on this side of the Atlantic if not in the world. WAR MYSTERY is her name, and she is the first pontoon the forests of Louisiana have furnished for the "bridge of boats" General Pershing has ordered built across the Atlantic.

Behind her, completed, possibly also on their way to an Atlantic port, are three more vessels of the same model as the WAR MYSTERY. The are WAR MARVEL, BONHAM and DORETA, all from the same yard as the WAR MYSTERY, the plant of the National Shipbuilding Co., Orange, Tex., and all built from lumber cut in the pine, cypress and oak forests of Louisiana. Still on the ways of the same yard are seven others, sisters to the four that have preceded them down to the sea. In addition to these 11, 19 more of the same type and size are to be constructed immediately, the full fleet for which the National company has contracts, being 30 huge freighters. Two of these—WAR MYSTERY and WAR MARVEL, have been built for the Cunard line, but the remaining 28 of the fleet are to go to the Emergency Fleet corporation, to add their tonnage to the American merchant marine.

Adequate Speed Assured

Each one of these ships is 315 feet long by 48 feet beam, with a depth of approximately 25 feet. Each is of 4700 tons, and each is to be so powered that she can make a minimum speed of 12 knots an hour. The maximum speed probably will be about 16 knots. Each is built by the new process of laminated construction, designed jointly by W. A. Ebsen, Philadelphia, and A. A. Daugherty, of California, New York and Mexico.

Eight months ago, on the Texas bank of the Sabine river, about a mile from Orange, just a stone's throw from Louisiana soil, stretched a tract of waste land, inundated at times, and apparently useless for any purpose. Then came a man named Daugherty, a man whose only description of himself was, and is, that "he has been building things ever since he can remember." He had some oil interests in Tampico, Mex., and he needed tankers. War was on—ships were priceless—he could not buy any. So he decided to build them, but he could not get steel. One day, while he was walking on the Louisiana side of the Sabine, he saw some of the miles on miles of pine forests.

This man named Daugherty, who wanted ships, knew a man named Ebsen, who designed ships and propellers. They got together.

Today, that strip of waste land along the Sabine river is the most productive area of its size in the South. Gathered around Ebsen and Daugherty, on that strip of Sabine river bottom, are 1400 hard working men, who draw $48,000 a week from the National Shipbuilding Co.'s payroll.

That strip of waste land is turning out one 4700-ton freighter every eight weeks, and is speeding up production all the time by adding ways as fast as the land can be drained, and men as fast as they can be found. Mr. Daugherty had eight men as nucleus for the human hive of workers that now greets the eye of the traveler at the National shipyard, but that eight-man nucleus has witnessed a remarkable growth. All the outfitting is being done right at the yard.

Late in June, word came from a California shipyard that the ribs of a 4700-ton freighter had been set up, ready for the sheathing, in 45 hours. Three days later came word that this record had been reduced to 35 hours. Daugherty called his 1400 workers together.

"Do we let these Californians get away with this?" he asked.

"We do not," the gang replied.

Within 30 hours and 35 minutes from the time these workers laid hand to timber, the 75 ribs of the 4700-ton freighter stood in the ways, bolted, braced and ready for the criss-cross sheathing, from which the laminated construction of the Ebsen-Daugherty type ship gets its name. It is a world's record.

Doesn't Need Blueprints

A request for the blueprints by which WAR MYSTERY and WAR MARVEL, and the rest of the wartime fleet were built, was met with a grin from Daugherty. "Do you know," he replied, "I'm going to have a big job getting those blueprints for the Cunard people two or three weeks after WAR MYSTERY sails out into the Atlantic. Other yards hired my drafting room force right over my head, and as there was no time to lose we just went ahead and built the ships without bothering with blueprints."

Every timber in these big ships, and every timber which will go into the sister ships of the fleet of 30, has come and will come from the forests of Louisiana. They have to be brought only a short distance to the yards on Sabine river, and this is one of the factors which counts heavily in favor of rapid production in the yards of the

Ebsen-Daugherty Type of Wooden Ships

THE National Shipbuilding Co., Orange, Tex., has launched the BONHAM *and* DORETA, *third and fourth of the 4700-ton wooden ships turned out by that corporation. Previous ships of the same type of "laminated" construction launched by the National company are* WAR MYSTERY *and* WAR MARVEL. *This design of vessel, commonly known as the Daugherty type, has been adopted, with some modifications, by the Emergency Fleet corporation, in place of the 3500-ton Ferris model, for future construction in yards along the Gulf of Mexico coast.* BONHAM *was the first of this new type and size ship to be put out for the Emergency Fleet corporation, the other two having been constructed for the Cunard line.* WAR MYSTERY *is ready for the overseas trade, and will be followed shortly by* WAR MARVEL.

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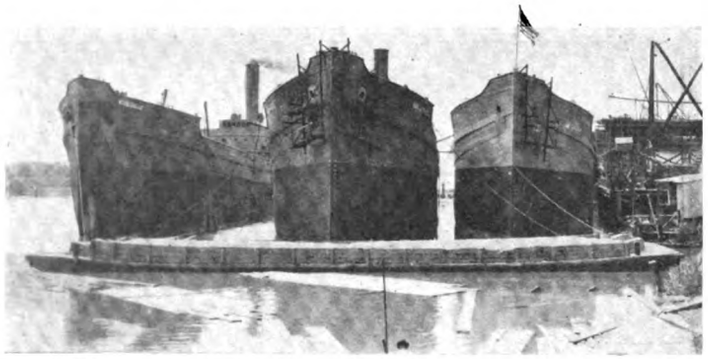
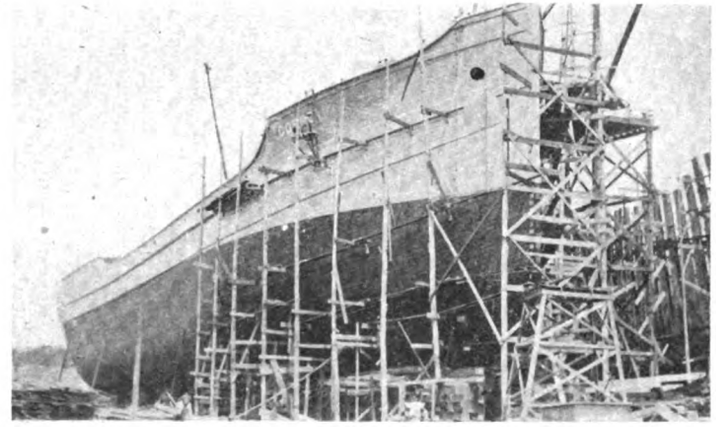
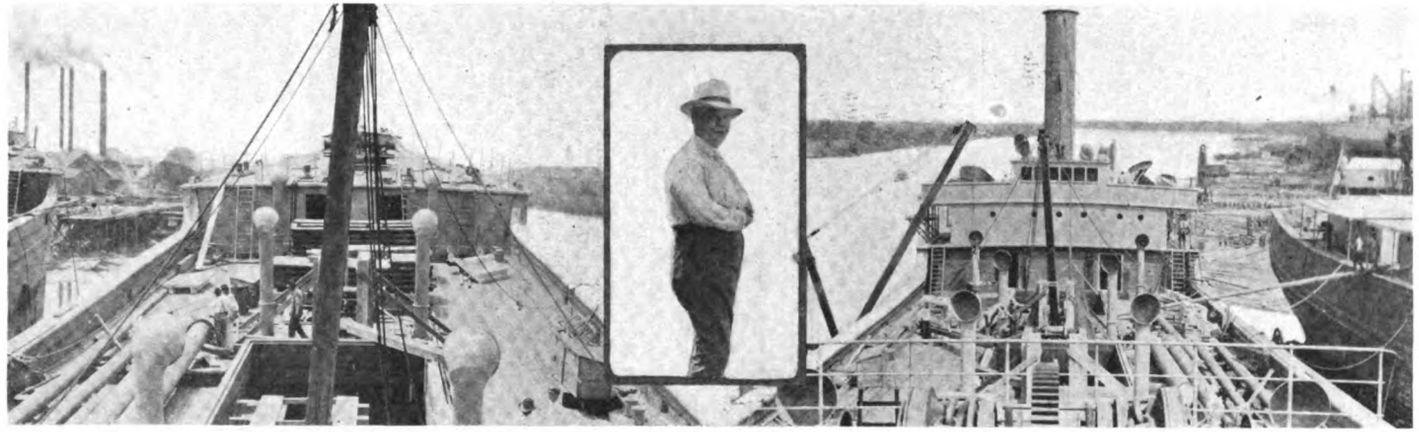


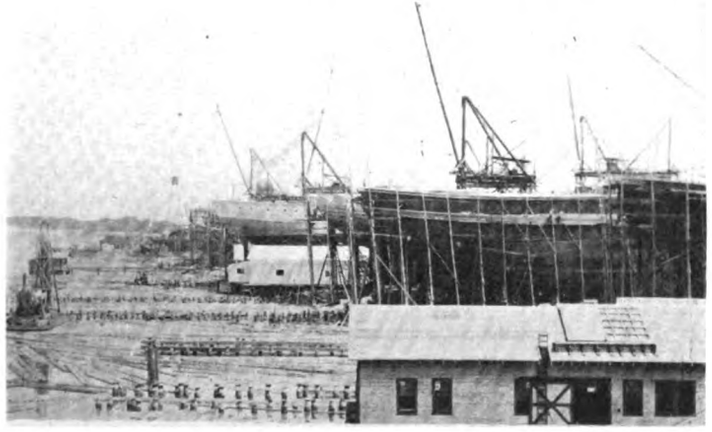
The three vessels shown at the left represent part of the Lone Star state's contribution to the defeat of the common enemy. These vessels were built by the National Shipbuilding Co., Orange, Tex., and from left to right are War Mystery, War Marvel and Bonham, each of 4700 tons. A sister ship to these, the Doreta, is shown at the right.



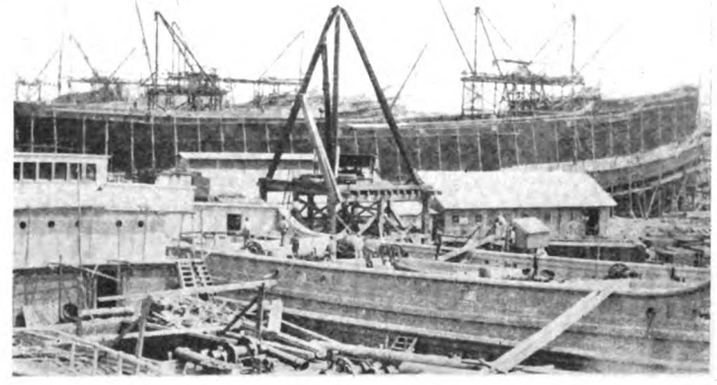


Deck view of the War Mystery looking forward showing the large cargo hatches and the high forecastle head deck.

Deck view of the War Mystery looking aft showing the bridge, officers' and engineers' quarters and wheel house.



At the left are shown five hulls of 4700-ton Ebsen-Daugherty type vessels rapidly nearing completion. At the right is shown, in the background, another vessel of the War Mystery type. This view gives a clear idea of the laminated construction, a feature of the Ebsen-Daugherty ships. A. A. Daugherty, on the job, appears in the center insert.



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National Shipbuilding Co., Orange, Tex.

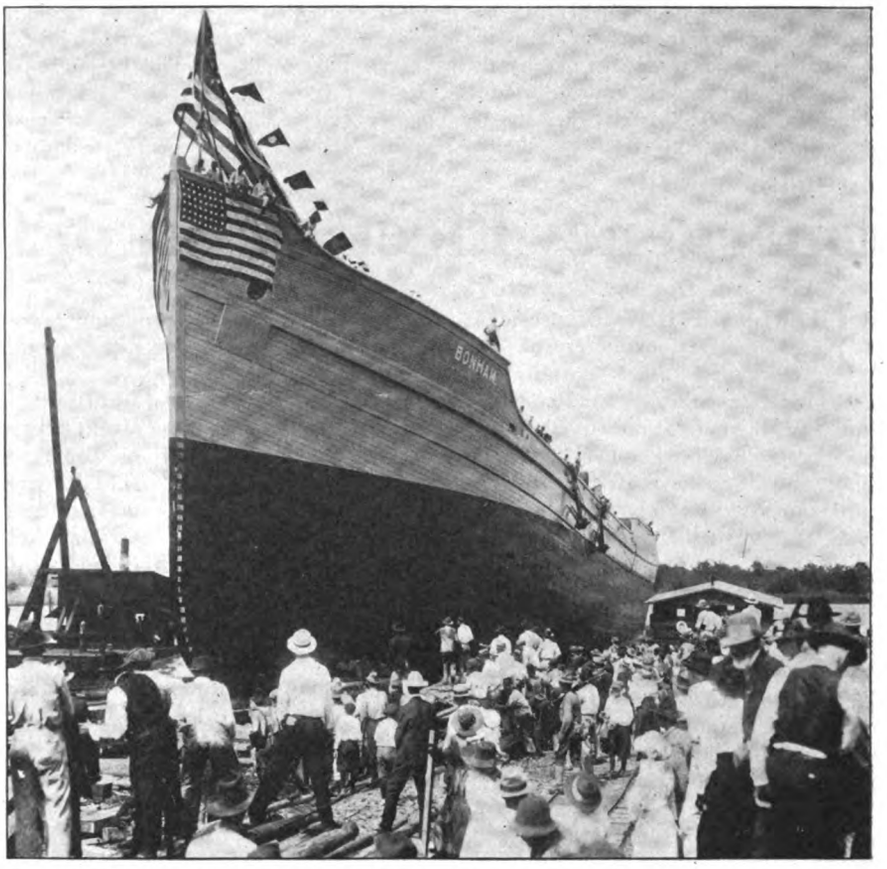
Mr. Daugherty is at work now designing a 4200-ton standardized concrete oil tanker, and a 4700-ton steel freighter, to be built in that indefinite period, after the war.

New Pacific Shipyard

With the Victory plant at Squantum, Mass., completed and boats being launched there every few days, the Bethlehem Shipbuilding Corp. has again turned its attention to further expansion. This is taking place at a new shipyard located at Alameda, Cal., near the present plant of the Union Iron Works.

Contract for the construction of the plant was awarded to the Aberthaw Construction Co., Boston, which recently completed the Victory plant.

The Alameda plant will be the second largest in the United States, exceeded in size only by Hog island. It will be twice the size of the Victory plant at Squantum and will involve twice the expenditure. The plant, which will be complete for building on 10 slips, will cover more than a third of a square mile and from 3,000,000 to 4,000,000 yards of dredging will be necessary. Large cargo vessels will be constructed, contracts for which have already been awarded to the Bethlehem corporation.



CITY OF BONHAM, DAUGHERTY TYPE, LAMINATED CONSTRUCTION WOODEN STEAMER

Recently launched by the National Shipbuilding Co., Orange, Tex. She is a sister ship to WAR MYSTERY and WAR MARVEL, launched previously from the same yard. All are of 4700 tons

Rare Woods Used in Shipbuilding---VI

By C. D. Mell

PRACTICALLY every country in the world lying within the tropics produces a wood called mahogany in the trade. The same may be said with reference to teak wood. Many timber dealers and shipbuilders know the true teak of commerce which comes from India, Ceylon, Burma and Siam, but only a few are familiar with the so-called African, West Indian, Brazilian and Philippine or New Zealand teaks. The latter, Molave, *Vitex littoralis*, which is also locally called *puriri*, is an important timber and has been known to European wood users for more than a century. While it is at present only rarely shipped into England and the United States, it is of interest to the trade because the wood is exceedingly durable. It was used for a long time as a substitute for the live oak and also for true Indian teak, with which it is closely allied botanically.

Molave is not confined to the Philippines, where it has been exploited for a great many years, but it is also quite common in New Zealand and other groups of islands in the South Sea. It is considered the finest and one of the most important timber trees in the Philippines and is found in nearly all forests along the coast where the soil is permanently moist. While this wood has been practically exhausted in New Zealand, it can be seen from its extensive distribution that vast quantities of the timber are procurable in many of the other South Sea islands where the timbers have hardly been touched.

Trees Yield Large Trunks

Under favorable conditions the molave tree attains a height of from 50 to 70 feet or more with a trunk from 2 to 5 feet in diameter. The bark is thin, smooth and grayish white, and the leaves are glossy light green, of the evergreen variety, about three or four inches long and two inches wide. Close to the sea, or in other locations where the trees are exposed to the wind, they have short crooked stems with low-spreading crowns. The wood from these crooked stems was formerly highly prized as a substitute for our live oak for knees used in the building of boats.

The sapwood in mature trees is of a yellow color and ranges from 2 to 3 inches in width. The heartwood, which contrasts strongly with the sapwood, varies from pale yellow to dark brown and is exceptionally durable. The wood is heavy (about 75 pounds per cubic foot), hard, strong, close and fine-grained, and the logs which come to market are usually from 16 to 20 feet long and about 16 inches square and free from defects. It takes a good polish, has a slightly acid odor and a bitter taste. It is one of the most useful timbers, and is employed extensively in shipbuilding, for railroad ties, posts, piles and for the frame work of houses and the foundation of large structures. For many purposes it seems to be fully the equal of true teak and has been classed in the third line of Lloyd's register.

Molave has a long list of important uses in the tropical east, where it is considered one of the most durable timbers for use in and out of water. It contains some tannin and for this

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reason was never requisitioned extensively for armor backing. In the Philippines it is regarded as one of the best woods for axles, beams, bridges, cabinet making, yokes, cogwheel teeth, general high-grade construction, docks, doors, finishing of houses, flooring, footing in the ground, posts, joists, knees, piles, pillars, pinions, planks, plows, rafters, rice mortars, shipbuilding, cutwaters, ships' knees, ribs, frames, siding of houses, sleepers, stemposts, sugar presses, wedges, wheel rims, undersills, paving blocks and for many other uses.

It is regarded by many judges as being equal to or even superior to teak for many important purposes.

Emergency Fleet's View of Concrete Ships

CHARLES PIEZ, vice president and general manager of the Emergency Fleet corporation, in outlining its policy toward concrete ships and their relation to steel and wood craft, disclosed some interesting points on the policy of the shipping board and the Fleet corporation. Mr. Piez's statement in full was as follows:

"A statement recently has appeared criticising the concrete shipbuilding policy of the United States shipping board Emergency Fleet corporation. This statement is so far from representing the actual facts, that, unless corrected, may lead to wholly wrong conclusions on the part of the public.

"The statement seems to be based on the conception there is a wholly untouched reservoir of both raw materials and labor, which can be used without burdening transportation facilities and without impairing in any possible respect the output of either steel or wooden ships now under contract.

"The statement also is predicated on the rather general, but wholly erroneous notion that a ship is simply a hull, losing sight of the fact that the equipment of a 7500-ton concrete cargo carrier, is exactly the same as the equipment of a 7500-ton steel carrier.

The Measurement of Capacity

"The statement, fails also, to recognize that, because of the limitations in our power and ship equipment producing capacity, our output of ships is measured by the number of vessels we can equip rather than by the number of hulls that we can launch. Facilities for the production of power equipment, deck equipment and other ship equipment, have steadily been added to and the production is constantly increasing. But, even today, the hull producing capacity of the country in steel and wood ships is in excess of what may be termed the power and equipment producing capacity for fitting out these ships. The mere addition of another 140 ways, turning out, as the author suggests, from 400 to 450 concrete hulls aggregating over two and one-half million tons would, even if that construction program were possible of execution, add not a single ship to our fleet.

"As a carrier, the steel ship is admittedly from 15 to 20 per cent more effective than a wooden or concrete ship of similar tonnage. The Emergency Fleet corporation has, therefore, been wise in concentrating its efforts on the construction of steel tonnage and treating the wood and concrete ships as purely emergency agencies.

Is Building to Equipment Limit

"The fleet corporation is at present building all the wooden ships that the resources of raw and finished material necessary will permit. Its program of steel ship construction likewise is planned up to the limit of the steel, machinery and equipment possibilities. The output of steel ships and of wooden ships is constantly increasing, but we have not yet reached anything like the possibilities of output in steel construction. The output of steel plates and shapes of our rolling mills still is considerably greater than the needs of steel shipbuilding at its present rate of production. Mr. Schwab's concern, in securing a proper distribution of the available steel supply, is not that the steel output may not meet our present needs, but that it may not meet the greatly expanded needs of our future plans. He is bringing the subject up in time that steps may be taken to increase steel producing capacity in conformity with plans of steel ship construction.

"The statement dwells on the boundless possibilities of the concrete ship and intimates that it is wholly the product of unskilled workers—workers, we presume, that could find no place in either existing steel or wooden shipyards. The writer loses sight of the fact that only 60 per cent of the total labor is connected with the hull construction. Fully 40 per cent of the total labor is connected with the installation of machinery and equipment. Labor connected with installation is the most highly skilled and most difficult to secure, and on this account any considerable expansion of the concrete shipbuilding program would interfere immediately and substantially with the program of ship construction now under way.

"The author of the statement is probably unaware of the fact that both the material and labor resources of the country are being taxed to their utmost by the war's demands; that there is no great available reservoir of even the kind of labor that he thinks could be used in constructing concrete ships, and that any expansion of the shipbuilding program, by adding a new type of character of vessel is made only at the expense of existing contracts.

"The board of trustees of the Emergency Fleet corporation recognized at a very early date the fact that the limitations lay, not in hull construction, but in machinery equipment and installation, and their policy with regard to concrete ships resulted from recognition of these limitations and not from any inherent prejudice against the concrete ship, nor from any lack of courage to try a new venture. As a matter of fact, the Fleet corporation began work on the actual design of concrete ships in December and has developed a technical division for this character of construction unequalled anywhere. Construction of five government-owned yards having four ways each, but capable of considerable expansion, was begun months ago, and these yards are now being constructed at an expense of $5,000,000, representing about $250,000 per way instead of $60,000 per way, the figures specified by the author of this statement.

Early Estimates Are Modified

"The statement quotes at length from a report made by R. J. Wig, chief of the concrete ship department of the Emergency Fleet corporation, and accepts the statements and recommendations of a gentleman who is an enthusiastic supporter of the concrete ship as representing the actual producing capacity of the country. Mr. Wig's estimates in regard to the cost of yards has undergone serious modification, and his estimate of possible ship production has, in the light of broader and more intimate experience with conditions surrounding all

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character of ship construction, undoubtedly undergone similar readjustment.

"The Emergency Fleet corporation has gone through a year of experiences, which have demonstrated conclusively that the hopes and promises of contractors are but frail foundations on which to base expectations of output. Statements of relative cost, of rapidity of production, of sections of the country that are available for the production of ships because they are not gorged with war work, all are glibly added to give a semblance of real research and analysis to a statement, that, after all, has been prepared after but a superficial review and insufficient knowledge of the subject.

"The statement that the Emergency Fleet corporation and the United States shipping board, while practically doing nothing themselves, are using their large powers to keep others from doing something, and that they actually seem to obstruct concrete ship plans of the army transport service, is wholly lacking in truth. The Fleet corporation has never stood in the way of capital and enterprise in undertaking ship construction, unless a new yard interfered with existing contemplated operation.

"The Fleet corporation has objected to the ship construction program of the army transport service purely because that program was undertaken without their consultation with or knowledge of the Fleet corporation and because several of the contracts were placed in districts which, by reason of existing congestion, were giving grave concern to the officers of the Fleet corporation. It would seem in the highest degree unwise to permit collateral branches of the government to compete with each other for the labor and material entering into ship construction, and this is bound to take place, when two separate branches undertake the same line and character of construction without consultation or co-operation. The war industries board has ruled that all ship construction shall clear through the Emergency Fleet corporation, and that after a very much fuller knowledge of the facts than was apparently available to the author of the statement."

To Keep Wood Yards Busy

"It is the intention of the United States shipping board to keep all of the wood shipbuilding plants supplied with contracts enough to keep them in operation at their present capacity for the period of the war," declared Charles M. Schwab in an address delivered recently in Seattle when he and his party paid a visit to that city.

Mr. Schwab, Charles Piez, Dr. Charles Eaton, Attorney C. W. Cuthell, Dr. S. A. Brown, R. D. Heinl, Cuthbert Maughan, C. J. McCarthy and J. H. Miller were met following their visit to the shipyards by a committee of the Washington Wood Shipbuilders' association, headed by Samuel H. Hedges, president of the Puget Sound Bridge & Dredging Co., and Mr. Schwab delivered the promise as quoted above.

Portland District Busy

Figures for the Portland, Oreg. district show that vessels under construction and contracted for on Aug. 15 totaled 91 wooden ships, 64 steel steamers and 5 concrete hulls. Expenditures under way and authorized in that district amount to $149,599,990. On the same day, at plants on the Columbia and Willamette rivers between Portland and Astoria, Oreg., and also including one plant at Tillamook, Oreg., there are 38 wooden vessels under contract or building, adding $20,750,000 to the expenditures or a total for the Oregon district of $170,349,990. The following record shows what the Oregon district is doing:

STEEL PLANTS

	Ships del'd	Ships bldg.
Northwest Steel Co.	12	20
Columbia River Shipbuilding Corp.	7	25
Albina Engine & Machine Works	6	9
G. M. Standifer Construction Co.		10

WOODEN PLANTS

Grant Smith-Porter Ship Co.	8	18
Supple-Ballin Shipbuilding Co.	3	11
Peninsula Shipbuilding Co.	4	12
Coast Shipbuilding Co.		8
G. M. Standifer Construction Co.	3	20
Kiernan & Kern Shipbuilding Co.	1	4
Columbia Engineering Works	6	5
The Foundation Co.	8	12

CONCRETE PLANT

Great Northern Concrete Shipbuilding Co.		5

OUTSIDE OF PORTLAND—WOOD

St. Helens Shipbuilding Co.	7	5
McEachern Ship Co.	8	10
Wilson Shipbuilding Co.	2	8
George F. Rodgers Co.		5
Feeney & Bremer		2
Total	75	189

Launchings in Northwest Show Decrease

NORTH PACIFIC shipyards launched 18 vessels during August, comprising 12 wooden vessels and six steel hulls. This total does not compare favorably with July's record but at several of the large steel yards, construction has been delayed to some extent by the scarcity of material. This handicap has now been well overcome and September is expected to make a far better showing.

During August, another new Seattle yard entered the running, this being the Allen Shipbuilding Co., which sent the 3800-ton wooden steamer BOSWORTH into the water. This vessel is of the Allen type designed by Frank Allen, president of the company, and approved by the shipping board. All the contracts held by this yard are for the Allen type, which has a deadweight carrying capacity of 300 tons greater than that of the Ferris type. The Chilman Shipyards, Hoquiam, Wash., launched its first contributions, the auxiliary schooners ADY and GABY of 500 tons each. These vessels are building for Belgian interests.

Of the other launchings, the 3500-ton wooden steamer TOKA was sent into the water by Meacham & Babcock, Seattle, on Aug. 22, the centennial anniversary of the steamer SAVANNAH. This was the occasion of a great patriotic celebration that attracted much attention.

With the 8800-ton steel steamer WESTMEAD, the Ames Shipbuilding & Drydock Co., Seattle, completed a remarkable 30-day record, in that period launching three big steel vessels of 27,600 deadweight tons. This plant has now launched eight steel steamers since Jan. 1 and the organization is rapidly hitting its stride. Following is a summary of the August launchings at north Pacific yards:

Aug. 17—BOBRING, 3500-ton wooden steamer, by Pacific American Fisheries Co., Bellingham, Wash.

Aug. 15—WEST HOSOKIE, 8800-ton steel steamer, by Skinner & Eddy Corp., Seattle.

Aug. 13—WESTPORT, 8800-ton steel steamer, by Ames Shipbuilding & Drydock Co., Seattle.

Aug. 19—WAR CHIEF, 8800-ton steel steamer, by Coughlan Shipyards, Vancouver, B. C.

Aug. 22—TOKA, 3500-ton wooden steamer, by Meacham & Babcock, Seattle.

Aug. 8—AMIENS, 3000-ton wooden steamer, by Foundation Shipbuilding Co., Tacoma, Wash.

Aug. 26—BOSWORTH, 3800-ton wooden steamer, by Allen Shipbuilding Co., Seattle.

Aug. 22—COLONEL DRIANT, 3000-ton wooden steamer, by Foundation Shipbuilding Co., Portland, Ore.

Aug. 20—BRAXTON, 4000-ton wooden steamer, by Peninsula Shipbuilding Co., Portland, Ore.

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Aug. 20—LATOKA, 3500-ton wooden steamer, by Grant Smith-Porter Shipbuilding Co., Portland, Ore.

Aug. 26—WEST VIEW, 8800-ton steel steamer, by Northwest Steel Co., Portland, Ore.

Aug. 8—BROOKDALE, 4000-ton wooden steamer, by Grays Harbor Shipbuilding Co., Aberdeen, Wash.

Aug. 23—OCTARARA, 3500-ton wooden steamer, by Nilsen & Kelez Shipbuilding Co., Seattle.

Aug. 27—WESTMEAD, 8800-ton steel steamer, by Ames Shipbuilding & Drydock Co., Seattle.

Aug. 25—GABY, 500-ton wooden auxiliary powered schooner, by Chilman Shipyards, Hoquiam, Wash.

Aug. 25—ADY, 500-ton wooden auxiliary powered schooner, by Chilman Shipyards, Hoquiam, Wash.

Aug. 28—WEST HUMHAW, 8800-ton steel steamer, by Skinner & Eddy Corp., Seattle.

Aug. 3—AIKEN, 3500-ton Ferris type wooden steamer, by Grant Smith-Porter Shipbuilding Co., Aberdeen, Wash.

Latest News from American Shipyards

THE Universal Shipbuilding Co., Sturgeon Bay, Wis., has taken over the entire plant and equipment of the Hess Iron Works, Inc., and will erect several buildings to effect a transfer of the works to its shipbuilding plant. W. J. Hess, general manager of the Hess Iron Works, joins the Universal company as superintendent of fabricating and boiler manufacture. The purchase will enable the Universal company to accept contracts for steel vessels. The company at present is building ocean-going tugs for the government. These tugs are to be 150 feet long, with 30-foot beam and 16½-foot draft. They will be driven by triple-expansion engines.

* * *

Contracts for four steel vessels of the 3800-ton type have been awarded by the Emergency Fleet corporation to the Albina Engine & Machine Works, Portland, Oreg.

* * *

Pendleton Bros., Inc., Mystic, Conn., launched the 3-mast schooner KINGSWAY on Sept. 7. The vessel was designed and built under a special form of construction developed by Fields S. Pendleton.

* * *

The Dierks-Blodgett Co., Pascagoula, Miss., recently launched the BELAIR, a 3500-ton wooden ship, and has three others on the ways.

* * *

The Hedges Shipbuilding Co., Moss Point, Miss., recently launched the wooden ship ALPACO, 3500-tons, and the Dantzler Shipbuilding Co., of the same place, launched a 3500-ton wooden vessel, the BOONE.

* * *

The Alabama Drydock and Shipbuilding Co., Mobile, Ala., recently launched a 10,000-ton mine sweeper and a 2500-ton composite ship.

* * *

A contract for building three shipways at Sparrows Point, Md., for the Bethlehem Steel Corp., recently was let to the Aberthaw Construction Co. The shipways when completed will accommodate vessels 600 feet in length.

* * *

A marine railway, to be constructed at a cost of $100,000, is to be built by the Emergency Fleet corporation for the Cumberland Shipbuilding Co., Portland, Me.

* * *

The Fabricated Ship Corp., Milwaukee, recently bought a machine shop, erecting shop and a quantity of shipbuilding equipment.

* * *

The Toledo Shipbuilding Co., Toledo, O., is contemplating the erection of additions which when completed will increase the company's capacity 25 per cent.

* * *

Frank A. Rumery, Robert Payson and M. E. Newcomb of Cape Elizabeth, Me., recently incorporated the Russell Shipbuilding Co. at Portland, Me. The company is capitalized at $150,000.

* * *

According to a recent report, the Buffalo Dry Dock Co., Buffalo, is having plans prepared for the erection of a machine shop to be built at a cost of $10,000.

* * *

The Terry & Tench Co., Long Island City, L. I., is said to be contemplating the erection of a shipbuilding plant near New York.

* * *

Bids are about to be taken by the Weehawken Drydock Co., Weehawken, N. J., for the erection of a shipbuilding plant to be erected at Peekskill, N. Y.

* * *

The Emergency Fleet corporation has arranged with the Louisville and Nashville railroad for a special shipbuilders' train to ply between Biloxi and the shipyards at Pascagoula, both in Mississippi. Shipyard workers at Moss Point, a suburb of Pascagoula, where there are several yards, are enabled to connect with this train by means of an electric car line which connects the two towns. This train will carry the workers from the yards of the Dierks-Blodgett Shipbuilding Co. and the International Shipbuilding Co., at Pascagoula, and the Dantzler and Hodge companies at Moss Point. More than 3000 men are employed at the Pascagoula yards and more than 2000 at Moss Point.

* * *

Pascagoula, Miss., which for years was merely a small village on the shore of Mississippi sound, has increased to 20,000 permanent population by the establishment of the Dierks-Blodgett, the International and other shipyards there. Moss Point, formerly a swamp, with a few houses and stores, a short distance from Pascagoula, has passed the 5000 mark and is driving on to 6000 as the result of the establishment of the Dantzler and Hodge and other yards.

* * *

Madisonville, La., where history has it, the Sieur Bionville repaired and outfitted his ships preparatory to his advance across Lake Pontchartrain into the Mississippi on his way to establish New Orleans, has grown to nearly 4000 population since the taking on of government contracts by the yards of the Jahncke Shipbuilding Corp. For more than 100 years, however, schooners and small steamers have been built at Madisonville, which lies across the lake, about 30 miles from New Orleans.

* * *

The Mobile Shipbuilding Co. launched the first of six Ferris-type hulls, Aug. 22, at Mobile, Ala. The launching was under the personal supervision of H. L. Britain, president, and Frank McLaughlin, general manager of the company.

* * *

The ONECO and the SWAMPSCOTT, first and second Ferris-type ships to be built and fully equipped in Beaumont, Tex., were announced as ready for the sea at the end of August. J. W. Link, president of the Beaumont Shipbuilding & Drydock Co., who made the announcement, said the ships were built and equipped from keel to truck, in the Texas port. Mr. Link added that the company's 8000-ton drydock would be finished early in 1919.

* * *

Two launching ways are virtually completed at the new shipyard of the Doullut & Williams Co., on the new industrial canal, at New Orleans. The city of New Orleans is building a shell road from the end of street car service to the yard. Large auto trucks will carry the men to and from their work.

* * *

Sixteen large stevedoring barges are being built for the United States navy by the Gulf Shipbuilding Co., Madisonville, La. Eight are to be delivered at New Orelans, four at Mobile and four at Pensacola.

* * *

The Jahncke Shipbuilding Corp., Madisonville, La., recently launched the first ship ever built near New Orleans for transatlantic use, when the BAYOU TECHE, a 3500 ton wooden vessel, slipped into the waters of the Tchefuncta river. Ernest Lee Jahncke, head of the corporation, announced that a similar ship would be launched every 45 days until the contracts were completed.

* * *

The Union Bridge and Construction Co., Morgan City, La., recently launched its second 3500-ton wooden ship for the government. The ship was christened AMORON. Four similar ships are under construction in the same yard.

* * *

Nearly 200 business men and city officials of New Orleans made a tour of the right-of-way of the new industrial canal recently. Industries involving an expenditure of more than $25,000,000 were inspected, including the canal itself, the government commodity warehouses, on which $10,000,000 is being expended; and the shipyards of Doullut & Williams and of the Foundation Co.

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On the Coasts, Lakes and Rivers

What's Doing and Who's Doing It

Lake Training Ship Put in Commission

By M. L. Shaner

WITH the arrival of the U. S. S. training ship MISSOURI from Milwaukee, Cleveland became the Great Lakes training base for the merchant marine. The vessel has been officially accepted for the government by Capt. Irving L. Evans, chief of the United States shipping board for the section. Officers of the ship will enroll 300 apprentices to be instructed as seamen, firemen, oilers, stewards, water tenders and coal passers for the merchant marine. Apprentices will be taken aboard the MISSOURI for a period of instruction, after which they will be temporarily assigned to lake vessels for further training. When the course of training is finished they will go onto vessels carrying troops and supplies to France.

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The steamer J. H. MCLEAN, going from Cleveland to Detroit on Wednesday night, Sept. 4, hit an obstruction at Bar Point reported to be the wreck of the steamer HENRY CORT. The CORT was sunk last winter and after considerable search was located this spring some five miles from where she went down, having drifted with the melting ice. The MCLEAN was without cargo and continued her trip to Detroit. As she was leaking in Nos. 1 and 2 compartments, however, she was ordered back to Lorain for repairs. In addition to about 150 damaged frames the steamer has 22 plates to come off, five of which will have to be replaced.

* * *

A big boulder in Ashtabula harbor has caused considerable trouble this season. A number of boats have been damaged by striking it. The latest of these is the steamer ISHPEMING which came to grief Wednesday, Sept. 4. Her No. 1 tank filled with water and she settled on bottom. She will go to Superior where she will dock for repairs. The boulder has been removed from the channel.

* * *

The steamer H. M. HANNA JR. caused considerable disturbance to Toledo rail traffic on Sept. 5. The HANNA crashed into the east span of the Lake Shore bridge, knocking it 10 feet out of line. The bridge is the main artery for rail traffic east and west of the city. The steamer was only slightly damaged and proceeded down stream to the plant of the Toledo Shipbuilding Co. At the time of the accident she was outbound and was carried against the bridge by the strong current and a high wind.

* * *

The name of the steamer E. N. BREITUNG has been changed and is now the JOHN F. MORROW. This is the second time that the name of the steamer has been changed for at her first coming out she was christened the JOHN W. MOORE.

* * *

The steamer H. B. NYE went ashore Thursday, Aug. 29, on the southwest bank of Cape Hurd, near Cove island, Georgian bay. As the boat was on rocky bottom in a heavy northwest wind and sea she leaked quite badly. She was released on the following Wednesday after lightering 2000 tons of her cargo of coal. She delivered her cargo at Byng Inlet, where she was bound and then proceeded to Lorain for repairs.

* * *

According to the captain of the steamer MARISKO, the wreck of the steamer WEXFORD, lost in the storm of Nov. 9, 1913, was sighted by him 16 miles off Kincardine, Ont. The MARISKO arrived at Goderich, Ont., on Aug. 26.

* * *

The steamer PHILETUS SAWYER of the Wells Transit Co. has been purchased by the Citizen Sand & Gravel Co. of Toledo. She is to be converted into a wrecking steamer and is being fitted out with a new derrick, centrifugal pumps and other necessary equipment. Capt. Clarence E. LeBeau will sail her. In addition the Citizens Sand & Gravel Co. is building a new tug. She will be christened the JAMES E. BRAILEY, for the vice president of the company.

* * *

The wooden steam barge TEMPEST, coal laden, sprang a leak and sank at 9:15 p. m., Aug. 27, in the entrance channel between the United States piers at Erie, Pa. The vessel lies in the northerly half of the channel, headed inbound, with stern about 75 feet west of the coast-guard station slip and 50 feet out from the north pier, in a depth of 43 feet. The bow is about 175 feet from the slip and 120 feet from the pier, in a depth of 33 feet. The foremast projects above water about 20 feet, the smokestack about 10 feet, and the stern flagstaff about 10 feet.

The wreck is lighted at night by a red lantern light on the foremast, and by a similar light on the stern flagstaff. There is a clear channel along the southerly side of the wreck not less than 25 feet deep, with least width, off bow, of 130 feet. It is expected that the wreck will be promptly removed by the owner, the Lawrence Steamship Co., New York.

* * *

E. D. Brigham has been appointed by R. H. Aishton, regional director, to the position of manager of ore, coal and grain traffic at Lake Superior and Lake Michigan ports, with headquarters at the Fidelity building, Duluth. In making this announcement the federal railroad administration disbands the former committee which had upper lake traffic matters in charge. Mr. Brigham had completed, just prior to his appointment, 45 years of service with the Chicago & Northwestern railroad.

* *

The LAKE GALERA, the third of the five full canal sized steamers which the Buffalo Drydock Co. has contracted to build for the Emergency Fleet corporation, was successfully launched at its yards at noon on Aug. 17.

* * *

The steamer CRAWL KEYS, which was built at the Ecorse yard of the Great Lakes Engineering works in 29 days, was accepted by the Emergency Fleet corporation on Wednesday, Aug. 14, is ready for business. The steamer was launched 14 days from the time the keel was laid and turned over to the owners in 29 days, thus setting a record.

* * *

The tug ASHTABULA rolled over in the Cuyahoga river Sunday, Aug. 11, while towing the steamer H. K. OAKES. The bodies of Engineer Earl Moormann and George Denny, who were drowned, were recovered. The tug was not badly damaged and was floated Aug. 15 and taken to the yard of the Great Lakes Towing Co. for repairs.

* * *

The steamer A. M. BYERS was aground at the entrance to Erie harbor from Friday, Aug. 16 to Thursday, Aug. 22. The lighter RESCUE of the Great Lakes Towing Co. went to the assistance of the BYERS and she was released after lightering about 200 tons of ore. The steamer was on soft bottom and was therefore not damaged. The lighter RESCUE took the lightered ore to the dock.

* * *

The steamer BALL BROS., which was aground at Erie several days, was released Wednesday, Aug. 21, after lightering part of her coal cargo.

* * *

The committee appointed at the last meeting of the Lake Carriers' association to fix a scale of wages reported Aug. 13. The schedule recommended was approved by the mobilization committee of the association. The schedule which calls for a general advance of from $7 to $20 per month has been made effective from Aug. 1.

* * *

The tug NORTH HARBOR, belonging to the Dunham Towing & Wrecking Co., was sunk at 1:30 a. m. on Wednesday,

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Aug. 7, at a point near mid-channel, abreast of the north pier light, at Calumet harbor, South Chicago. Two men were lost. The company at once placed buoys and stationed a gasboat to warn all passing vessels. Also an efficient light will be maintained by the company until the boat has been floated.

* * *

The steamer TAURUS, coming in light from Ashtabula during the storm early in the morning, Sept. 6, hit the west arm of the breakwater at Cleveland and damaged three or four plates. After an examination had been made the TAURUS left for Toledo where she docked for repairs.

* * *

Freight handlers at Buffalo have been on strike twice during the last few weeks. The first strike, which was called Monday, Aug. 12, was settled when W. J. Connors agreed to pay the men for the time they are obliged to wait in case the boat to which they have been called is late. He also agreed to pay them for shifting. This is in addition to the regular 60 cents per hour straight time and 75 cents per hour for overtime, Sundays and holidays which they are to be paid. The second strike occurred on Aug. 27 when the men on the Lehigh Valley dock demanded that a certain foreman be discharged. This man recently caused the arrest of a Polish workman who had struck him. The walkout caused considerable inconvenience as there was a quantity of government freight urgently needed for war purposes waiting to be unloaded. Soldiers were called upon to unload this government freight.

Along the Atlantic and Gulf Coasts

A STEAMSHIP service between Boston and Japan is about to be inaugurated following a visit to the New England port of Captain Hinokuma, representing one of the largest steamship companies in the Orient which now operates a service between Japan and the Pacific coast. Captain Hinokuma said it is planned to send general cargo vessels of about 10,000-ton capacity through the Panama canal in connection with the proposed route. Yokohama and Kobe are the shipping and receiving ports of the enterprise. Terminal facilities at Boston have been assured, it is said.

* * *

A new steamship service between Boston, Nova Scotia and Newfoundland by the Nova Scotia Lines, Ltd. is being arranged and the initial sailing is expected to take place at an early date. Waterfront privileges have been secured and F. C. Chapman, for years connected with the Plant line, is spoken of as general manager for New England.

* * *

After running the gauntlet of submarines since the war the Leyland Line steamship WINNIFREDIAN, in the Boston-Liverpool service, stranded on an island off the north Atlantic coast and may be given up as a structural loss.

* * *

Two-mast schooner WESLEY ABBOTT, built at Ellsworth, Me., in 1870, has been purchased by D. W. Simpson, Boston, and will be fitted for the provincial trade.

* * *

Four-mast schooner HESPER, built for Rogers & Webb, Boston, by the Crowninshield Shipbuilding Co., Fall River, Mass., is about ready for her maiden voyage.

* * *

Two additional inspectors have been added to the steamboat inspection service at Boston on account of increased business in connection with the merchant marine.

* * *

Two-mast schooner ETHEL F. MERRIAM, built at Boothbay, Me., in 1889, has been sold by F. Nolan to Splane Bros., Boston, who will convert the vessel into a water boat.

* * *

The new fishing schooner RUSH, running out of Boston and owned by the Commonwealth Fisheries Co., has been sunk by a German submarine. The vessel was valued at $40,000 and Capt. Frank Quodros was the master.

* * *

Richard Bateman, nearly 50 years in service of shipping firms and lately with A. C. Lombard's Sons, Boston, is dead.

* * *

Three-mast schooner MELISSA TRASK, built at Brewer, Me., in 1880, has been purchased by the Boston Shipbrokerage Co. from the Dominican Transportation Co. and will be placed in the coastwise trade.

* * *

Owners of the steamer T. E. DORR have received $20 per 1000 feet on a cargo of lumber from Jacksonville, Fla., to Boston. Before the war $6 was regarded a high rate.

* * *

Two Boston sailing vessels, the AVON and TIMANDRA, are long overdue on a passage from Atlantic ports to the River Plate. The AVON was commanded by Capt. J. S. Schmiesser of Boston and the TIMANDRA's master was Capt. Richard Lee of Yarmouth, N. S. In shipping circles, belief is expressed that the square-riggers were sunk by raiders.

* * *

Copper mines at Blue Hill, Me., long idle, are now being worked and furnish ore cargoes for many coasters destined to Boston.

* * *

The Ross Tow Boat Co., Boston, has purchased tug W. H. GALLISON of the Cole Dredging Co., Fall River, the vessel having been built in Boston in 1892.

* * *

The new United States life-saving station, being built at a cost of $60,000 on Grande Isle, La., is virtually completed, while ground has been broken for the high-power federal wireless station which is to rise alongside the new home of the coast guards. The station building is concrete and steel, set on deep concrete foundations, so as to be able to withstand the storms which frequently sweep over this island. A crew of 12 men and their officers will be stationed there. Land for both stations, life-saving and wireless, was donated to the government by John Ludwick, a planter and merchant of Grande Isle.

* * *

Peter Sandifort, a worker in shipyard No. 12, of the Foundation Co., New Orleans, is under arrest on charges of willful injury and destruction of war property, and of attempting to delay war work. Sandifort is the first man to be arrested in Louisiana on this charge. He had been working in a lumber yard at Bogalusa, La., and was arrested and tried there on the charge of attempting to incite negro workers to strike and thus delay production of ship timbers. Evidence against him was not strong enough, however, and he was acquitted. Agents of the department of justice followed Sandifort to New Orleans, where, two weeks ago, he obtained employment in the Foundation Co.'s machine shops, and almost immediately, according to the government's charges, resumed his efforts to foment trouble and delay work on the plant. Penalty for this offense is a fine of not more than $10,000 or not more than 30 years in prison.

* * *

The city council of Beaumont, Tex., has granted a lease for 11 acres of city waterfront land to J. J. Schultheizer for the establishment of a yard for the construction of wooden barges for the government and of wooden ships for private contract. The land in question takes in the yards of the Henry Piaggio company, which have been used for more than a year for the construction of big auxiliaries for the Italian government and for individual shipowners. The last of these barks, CITY OF DALLAS, was launched Aug. 27, and Mr. Schultheizer is to take over the Piaggio equipment, thus getting possession of much machinery and shipbuilding tools almost impossible to obtain at present. In addition to the Piaggo plant, the new owner gets enough ground to enable him to set up eight ways, which, when completed, will make this one of the largest yards in the Texas district. Mr. Schultheizer announced that he had been assured of contracts for six large barges for the government as soon as his plant is ready for work.

* * *

Work has commenced in the yards of the Mississippi Shipbuilding Corp. at Biloxi, Miss., on two 1500-ton auxiliary schooners for use in the gulf trade. Biloxi, with three shipyards on the Bacy bay, is now endeavoring to obtain government aid for the deepening of the channel around Deer island, so that larger ships may be launched. The yards are equipped to build large freighters, but owing to the shallow channel, are unable to get them to sea when completed. The Mississippi corporation also has plans prepared and

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contract signed for the construction of a steamer.

* * *

The United States shipping board, in line with its efforts to centralize control of its activities, has removed its lumber headquarters from New Orleans to Philadelphia. W. J. Haynan has been designated head of the new lumber section, with the title of general lumber supervisor.

* * *

Housing conditions at the Algiers naval station, New Orleans, are to be improved by the construction of 104 cottages, 50 of four rooms, 50 of six rooms, and four for superintendents, and one restaurant building, according to an announcement by William D. Ross, chairman of the subcommittee on naval bases. A large motor launch also is to be installed.

* * *

The MANDEVILLE, formerly the HANOVER, a steel excursion steamer, operating for some years on Lake Pontchartrain, New Orleans, has been taken over by the United States shipping board, under charter, for use as a training ship for recruits for the American merchant marine. The boat is owned by the Louisiana Transport & Ferry Co., New Orleans. She is being remodeled and will have quarters for 10 officers, 24 instructors and 240 students. Capt. E. B. Drake will be in charge.

* * *

One of the Emergency Fleet corporation's schools for the training of instructors in shipbuilding and shipyard work is being installed at the Algiers naval station, New Orleans. It has been entitled "New Orleans Training Center, No. 24."

* * *

The ST. LOUIS, a river steamer belonging to the St. Louis & Tennessee River Packet Co., ran on a snag 23 miles south of St. Louis, Sept. 2, and sank in 20 feet of water. Two persons were drowned. The steamer will be raised.

* * *

Twenty thousand men are employed in shipyards along the gulf coast from and including Mobile, Ala., to New Orleans, according to estimates of persons familiar with the labor situation in Alabama, Mississippi and Louisiana.

* * *

Establishment by the Woodward Iron Co. of a $25,000,000 government-aided steel plant, at Woodward, Ala., will be of great aid to shipbuilders and other users of structural steel all along the coast of the Gulf of Mexico. Announcement of the establishment of this plant, which is to be financed by the war industries board, was made in August by Senator Bankhead, of Alabama.

* * *

Six per cent is a fair rate of income on land rented or leased to shipbuilding companies, according to decision reached by the Mobile, Ala., rental board and the adjusters between owners of shipyards and their landlords. Adjustments are being made in Mobile and in other Gulf coast cities on this basis.

* * *

Natchez, Miss., has ordered an election on the proposition to issue bonds to construct rail and water terminals on the river front, to accommodate steamboat and barge service on the river.

* * *

A permanent branch office has been established in New Orleans by Allied British Commerce, Ltd., London. Charles A. Wake, a director of the company, is in charge. The corporation acts as agent for both importers and exporters.

Up and Down the Pacific Coast

ONE of the most costly marine mishaps in north Pacific waters in months was that in which the Japanese steamship CANADA MARU was the victim. Bound from the Orient with a $4,000,000 cargo, the liner went aground in dense fog close to the entrance to Puget sound and remained fast on the rocky beach for a week. Only prompt salvage operations and good weather prevented the total destruction of vessel and cargo. Examination of the hull disclosed damage for a distance of 130 feet from the bow aft, affecting 130 steel plates. Repairs will be made by Yarrows, Ltd., Victoria, B. C., at an estimated cost of $500,000. As a tragic finale to the mishap, Capt. Y. Yamamoto committed suicide in Puget sound after the vessel had been released. No blame, however, was attached to the master his deed being attributed to the ancient Japanese custom of giving ones life in expiation of serious mishap.

* * *

Deliveries of wooden steamers, being built at north Pacific yards for the government, have been retarded in some instances because of delay in obtaining machinery and equipment. The demand for engines and machinery is so great that some delay was anticipated. Government officials are attempting to relieve the situation and it is expected that many vessels, which have been in the water for some time, will shortly be ready for use.

* * *

Reports that the Pacific Steamship Co. is about to purchase outright the fleet of the Pacific Coast Steamship Co., are branded as premature by H. F. Alexander, president of the Pacific Steamship Co. However, it is not denied that negotiations are under way. The reported amount involved is $4,000,000. When the fleets of the Pacific Coast Steamship Co. and the Admiral line were merged on Nov. 1, 1916, under the name of the Pacific Steamship Co., it was under a chartering arrangement.

* * *

Alaska salmon is arriving in great quantities at Seattle and reports from the northern districts indicate that the pack will be well above the average. Most of the pack has been placed at government disposal. On the Columbia river, the fishing season closed last week with a catch about equal to that of 1917. The Columbia river pack is estimated at 500,000 cases valued at about $4,000,000.

* * *

After being on the beach on the rocky shores of Resurrection bay, near Seward, Alaska, for months the steel barge BARRACOUTA, owned by James Griffiths & Sons, has been floated. The BARRACOUTA was formerly a steamship plying out of San Francisco. For several years, James Griffiths & Sons have operated her as a barge. While at anchor at Seward in November, 1917, the vessel was blown adrift during a heavy storm and piled up on the beach several miles away. Salvage operations were under way for some time.

* * *

Work of rehabilitating the steamer ADMIRAL EVANS, which was seriously damaged by grounding in Alaskan waters last spring has begun at the plant of D. W. Hartzell, Inc., Eagle Harbor, Wash. At this plant replacing of the steel plates will be done, the contract having been awarded by the Pacific Steamship Co. Negotiations are now under way for reconstructing the entire upper works. All the woodwork on the steamer will have to be replaced as her house and fittings were destroyed.

* * *

Consolidation of the whaling interests in the north Pacific has been completed with the incorporation of the Consolidated Whaling Co., Ltd., with a capital of $2,500,000. Headquarters are at Toronto and the head operating offices at Victoria, B. C. The new company has absorbed the Victoria Whaling Co., with plants on Vancouver island; the American-Pacific Whaling Co., with plant at Bay City, Wash., and the North Pacific Sea Products Co., with a plant on Akutan island, Alaska. The combined fleets of the company have taken 650 whales this season up to Aug. 15. Up to the same date 114 whales had been brought into the Grays Harbor, Wash., plant.

* * *

According to plans of government officials, eight wooden steamers will be delivered monthly ready for sea service from the Portland and Columbia river district. Recently 73 wooden hulls were in process of being equipped with engines, boilers and general fittings.

* * *

After serving for years as the salvor of north Pacific shipping, the British steamer SALVOR has been sold to Powell Davis, Montreal, and will enter the Vancouver-Australian service. The SALVOR has made a name for herself by saving many vessels on this coast. She was built at Glasgow in 1869 and won the distinction of being the first merchant ship to pass through the Suez canal. She later brought to England from South Africa the body of David Livingstone, the famous explorer. The British Columbia Salvage Co., owner of the SALVOR, is planning to replace her with the steamer TEES, now engaged in British Columbia coasting trade.

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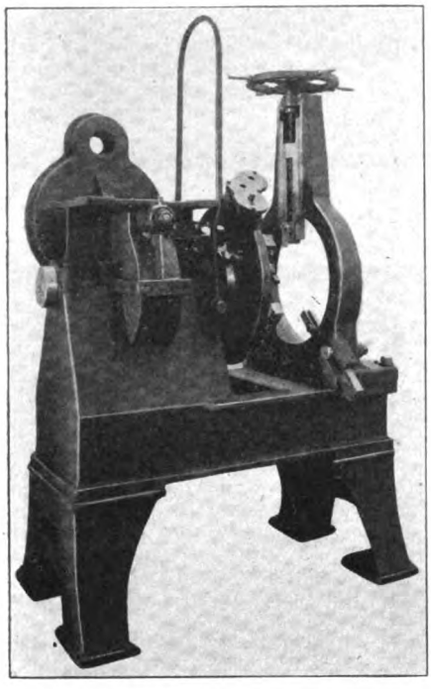
Equipment Used Afloat and Ashore

Flange Facing Machine—Turbo-Generator—Combination Shipyard Tool—Melting Furnace—Propeller—Welding Small Chain

THE flanges of high-pressure copper pipes as used in ship installations should be faced off square and true, otherwise serious leaks and other defects are bound to develop. After the flange has been brazed in place on the pipe, it is an awkward job to face it, especially if the pipe is of irregular shape. To overcome this difficulty, the Newton Machine Tool Works, Inc., Philadelphia, has developed a special machine for this purpose which is shown in the accompanying illustration.



UNIT FOR FACING PIPE FLANGES

After the flange has been brazed to the pipe, the unit is securely clamped in the steady rest. This has three jaws, the two lower of which remain stationary after clamping in the desired position. These stationary jaws are graduated for quick setting. The third, or upper, jaw is actuated by a screw and hand wheel which affords means for rapid clamping. The jaws are equipped with swinging stops, the object of which is to locate the flange both square and plumb. The flange is brought against these stops and after the upper jaw is brought in position the stops are swung out of the way.

The facing tool is held in a tool post, the slide for which is fed through the medium of a star wheel which is rotated by a stationary stop. This principle has proved efficient in actuating tools that have a combined diametrical and rotary movement.

The spindle of this machine is of ample dimensions to insure freedom from chattering and is driven by a bronze worm wheel and a hardened steel worm. This drive is encased. The worm shaft is equipped with roller thrust bearings and the worm and worm wheel are oiled by continuous lubrication. The drive between the motor and the worm shaft is through spur gearing. The motor is mounted on the top of the machine base; but is not shown in the illustration.

The main castings of the machine are of ample section to insure stability and are ribbed where necessity requires. To provide a quick means for moving the machine from place to place in the coppersmith shop, a heavy bail is installed. Thus it is an easy matter to pick up the unit with a crane.

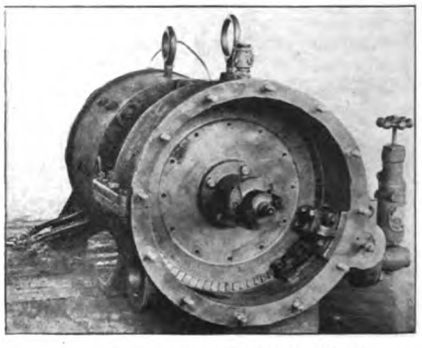
The machine has the following capacity dimensions: Diameter of spindle, 3½ inches; maximum diameter of flanges that can be faced, 20 inches; distance from center line of spindle to top of base, 15½ inches; length of star feed to tool post, 10 inches; length of in-and-out hand adjustment to tool post, 2 inches.

Turbo-Generator

The Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has recently produced a small turbo-generator unit for direct-current service. This unit is designed for 10 kilowatts output, although a temporary load of approximately 12.5 kilowatts may be obtained. A smaller unit of 8.5 kilowatts gives a range of capacity suitable for lighting work. Its range of capacity, its range of operating conditions and its construction are designed to adapt this unit for many uses. Among these is the flood lighting for night work in shipyards.

The 10-kilowatt set has been built to operate under trying conditions. For this reason it is constructed as simply as possible while retaining many of the features found desirable in larger units. Among these are a hand and automatic throttle valve and an emergency overspeed governor. The latter feature is placed on the generator end of the unit and automatically closes the throttle valve of the turbine, if the unit should show a disposition to overspeed. The device consists of a small weight placed in the shaft of the unit which, at a predetermined speed engages a trip lever connected in such a way to the throttle valve that it is automatically closed.

The turbine rotor is a steel forging. In the periphery are placed steel blades which are held in place by pins securely driven in through the blade and the rotor. The blades are of the impulse type and, although there is only one row, by means of a reversing chamber the same steam is passed through the blades a second time thus allowing for complete expansion..



SMALL TURBO-GENERATOR

The generator is equipped with self-aligning ball bearings. The bearings on small units are suited for a variety of services, particularly for marine installations which frequently compel the unit to operate at various angles due to the pitching and rolling of the vessel. The unit is 3 feet 8½ inches long, 23 inches wide and 18¾ inches high.

Combination Tool

Among the many tools that have been developed to meet the demands of modern warfare are to be found designs that are distinct departures from the beaten path. A machine in this category is shown in the accompanying illustration. This tool is a product of the Buffalo Forge Co., Buffalo, and is a combined slitting shear, punch and bar cutter.

The design is a European one where-

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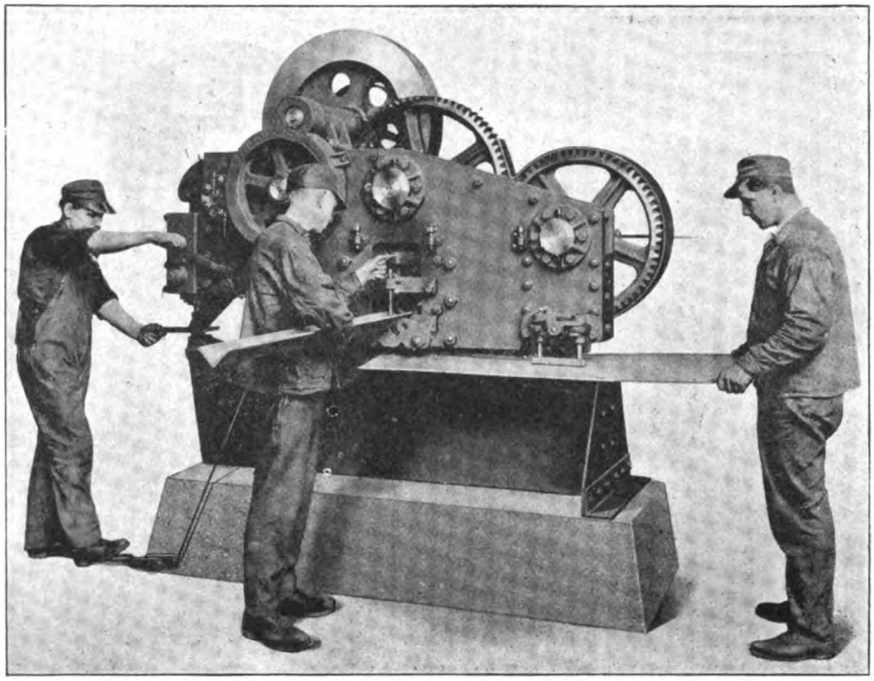
in sheet steel, to a large extent, takes the place of heavy cast iron construction. It is said that these tools have been subjected to severe duty in the shipyards of France and England with entire success. It is also claimed that these tools weigh but one-sixth as much as similar machines with cast iron frames.

The three functions of the machine are entirely independent of each other and, as the illustration shows, three men can be engaged on different operations at the same time.

The machine is built either for belt or motor drive and all gears are steel. The pinions are manganese steel. All bearings are bronze bushed and lubricated by ring oiling systems.

The machine will shear plates 5/8-inch thick and flats, 3x3/4 inches. The bar cutter will cut square angles 4x4½ inches, mitered angles 2½x5-16 inches, T-iron 3½x3/8 inches, rounds 1½ inches, squares 1¼ inches, I-beams 6x12¼ inches and channels 6x10½ inches. The punch has a capacity up to holes one inch diameter through a 5/8-inch plate.

The machine makes 25 strokes a minute, and when motor driven requires five brake horsepower for operation, although a 7½-horsepower motor is recommended by the manufacturers.



BAR CUTTER, SHEAR AND PUNCH COMBINED AS ONE UNIT

Melting Furnace

The furnace shown in the accompanying illustration was recently developed by the Hausfeld Co., Harrison, O., for melting nonferrous metals. This apparatus is said to be particularly adapted to use in shipyards for melting babbitt and composition-bearing metals.

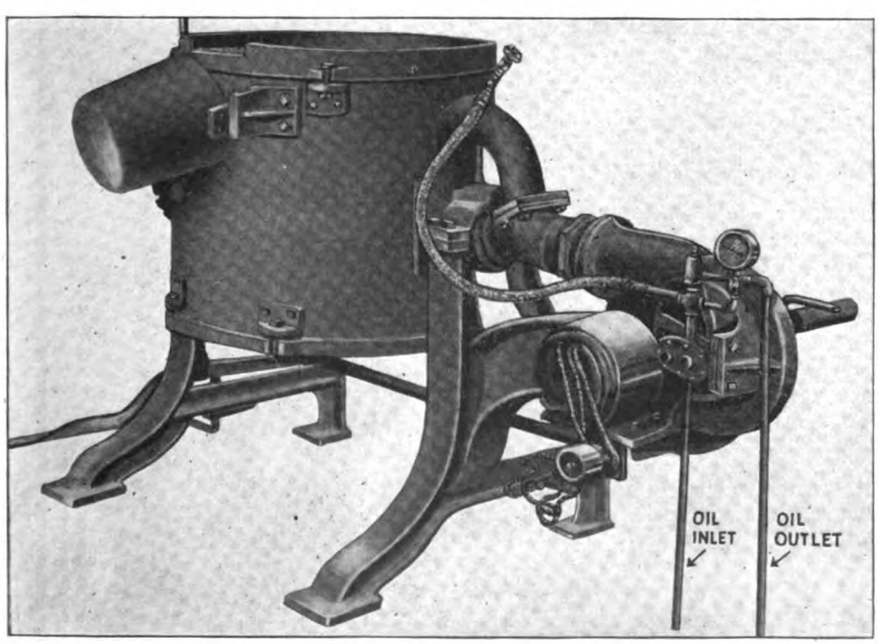
The furnace is of the open-flame, noncrucible, tilting type with a capacity of 400 pounds. A complete unit consists of the furnace proper, lined ready for service, a ½-horsepower motor, either direct or alternating current, fuel oil feeder, burner and a pouring ladle. The furnace burns either gas or oil and no other equipment aside from piping to the fuel supply is necessary. One of the advantageous features of the unit, it is said, is the ease with which the change can be made from oil to gas or vice versa.

The oil feeder develops a lift of over 18 feet and has a delivery pressure of 60 pounds. It is equipped with a relief valve which can be regulated. The outlet of the relief valve is piped to the oil reservoir which permits the return of excess oil to the reservoir.

The burner is arranged to heat the oil previous to its injection into the furnace. The location of the needle-point seat is at the extreme end of the outlet, resulting in a spray of wide range. To increase this range and break large particles of oil, a small baffle bar is located directly in front of the burner outlet.

The plain shape of the furnace drum facilitates relining and the bricks are furnished with interlocking joints which prevent the seepage of metal. The pouring ladle is located directly over the pouring hole where it remains during the melting of the entire heat. By this arrangement the ladle is heated and a preheating furnace is unnecessary.

The furnace is tilted by means of a handle. The locking arrangement is spring actuated and the drum can be securely held in any position desired. The lock is released by foot pressure on a treadle at the base. This permits the use of both hands for tilting or rocking the drum. For convenience, a double treadle is provided. One end extends to the front and the other to the rear of the operating side and when tilting the furnace the most convenient treadle is used. Upon release of the foot pressure the drum is instantly locked.



FURNACE FOR MELTING NONFERROUS METALS

A new drydock which is to be one of the largest in the world is to be built at St. John, New Brunswick. A contract for its construction has been let by the department of public works, Ottawa, Ont., to the St. John Drydock & Shipbuilding Co. The dock will be 1150 feet long and 125 feet wide at the bottom.

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